SIMRAD

PRO SERIES

ARGUS RADAR SYSTEM

Installation & Service Manual

ENGLISH

ARGUS RADAR

PRO.SIMRAD-YACHTING.COM

RECORD OF CHANGES

Part number/Rev.	Date	Purpose of change	Requested by
988-10187-001	September 2011	First issue	
988-10187-002	December 2013	Software release 3.2	M. Carmagnini
988-10187-003	October 2014	Software release 3.2.5	M. Carmagnini

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SHIPPING AND UNPACKING

The unit parts are placed in cardboard boxes covered with a plastic sheet. Each box includes a protecting polyurethane box shaped for the contained parts.

The following general rules apply:

- Inspection for damage during transport.
- When the unit(s) arrive at destination, inspection should be made immediately to register any damage that may have occurred during transport.
- The customer is normally responsible for insurance during transportation. If any damage is found, both the insurance company and the shipping agent must be informed immediately.
- Units must be transferred on board still packed into their boxes.
- When the units are removed from their boxes, they must be left in their protective plastic cover until installation.

It is advisable to keep the packing material for possible future use. The plastic sheet the unit is wrapped in, can be used to protect it during installation and maintenance procedures.

In addition to the various main parts, the package should also include:

- Technical Manual with installation procedures.
- Installation kit (terminals, clamps, connectors etc.)
- Standard spare part kit (fuses, screws etc.)

The installation kit and spare part kit are necessary for the installation and operation of the equipment, and must be kept together to perform the installation work. Contents of the kits should be checked immediately after unpacking, using the supplied material list in the box. The manufacturer will not accept claims for missing items unless presented immediately after unpacking.

STORAGE

After the material contained in the boxes have been inspected in the presence of the customer and have been verified that no damage has occurred, the unit shall be stored in its original packing until the time of installation. The storage premises must be dry and well protected.

If the units must be kept in storage for more than one month, it is advisable to insert hygroscope substances, such as silicon gel salts, in the crates.

The Argus Radar System contains delicate electronic components, please handle accordingly.

WARNINGS

HIGH VOLTAGE

Radar equipment includes high voltage that can cause injury or loss of life. Danger exists only when the units are opened for service, exposing internal circuits. The ARGUS Radar has been carefully designed to protect personnel from possible injury from high voltages.
Nevertheless, it is recommended that the Main Power Line shall always be OFF as an added protection when inspecting or servicing the equipment.
Although every effort has been made to eliminate danger to personnel, no responsibility is accepted for any injury or loss of life suffered in connection with this equipment.

X-RAY RADIATION

X-RAY radiation may be generated by Transceiver units and care must be taken to avoid possible harmful effects when they are opened for maintenance. When power is on, care should be taken not to approach **closer than 1 ft. from the unit unless top cover is in place.**

RADIO-FREQUENCY RADIATION

Harmful effects (particularly to the eyes) may be caused by exposure of any part of the human body to radio-frequency mean power densities in excess of 100 mW/cm2. This power density is exceeded at a distance of 1 ft. or less from the 12 ft. X-Band aerial (when stationary).
The system is designed to disable radiation when the antenna is not rotating.
The pedestals have also been prepared for installation of an external safety switch, which can be mounted on, or near the platform. This switch disconnects the power from the Pedestal preventing accidental operation during servicing.
Whenever it is necessary to disconnect the waveguide system from a radar transmitter for maintenance purpose, the transmitter output should, when practical, be terminated in a matched load. If this is not possible, care should be taken to avoid standing in front of an open-ended waveguide from which power is being radiated.
NEVER look down a waveguide from which power is being radiated.

SAFETY SWITCH

The Radar Unit is provided with a safety switch, which disables the antenna rotating during maintenance and service.

SAFETY PRECAUTIONS

Purpose

Safety precautions described in this paragraph are applicable to the Argus X-Band Radar System. Depending upon the type of advice, the following attention signs are used in the technical manual:

WARNING

IF THIS OPERATING PROCEDURE, MAINTENANCE PROCEDURE, PRACTICE, CONDITION OR STATEMENT IS NOT STRICTLY FOLLOWED, IT COULD RESULT IN SEVERE INJURY OR DEATH OF PERSONNEL.

WARNING

IF THIS OPERATING PROCEDURE, MAINTENANCE PROCEDURE, PRACTICE, CONDITION OR STATEMENT IS NOT STRICTLY FOLLOWED, IT COULD RESULT IN DAMAGE, OR DESTRUCTION OF UNIT, OR LOSS OF TRANSMISSION EFFICIENCY.

NOTE

Advice of an essential operating procedure, maintenance procedure, condition or statement, which must be followed.

Whenever a precaution, relating specifically to a part of the technical manual is needed, precaution information is given in the relevant part of the manual. Warning and Caution Signs precede applicable text.

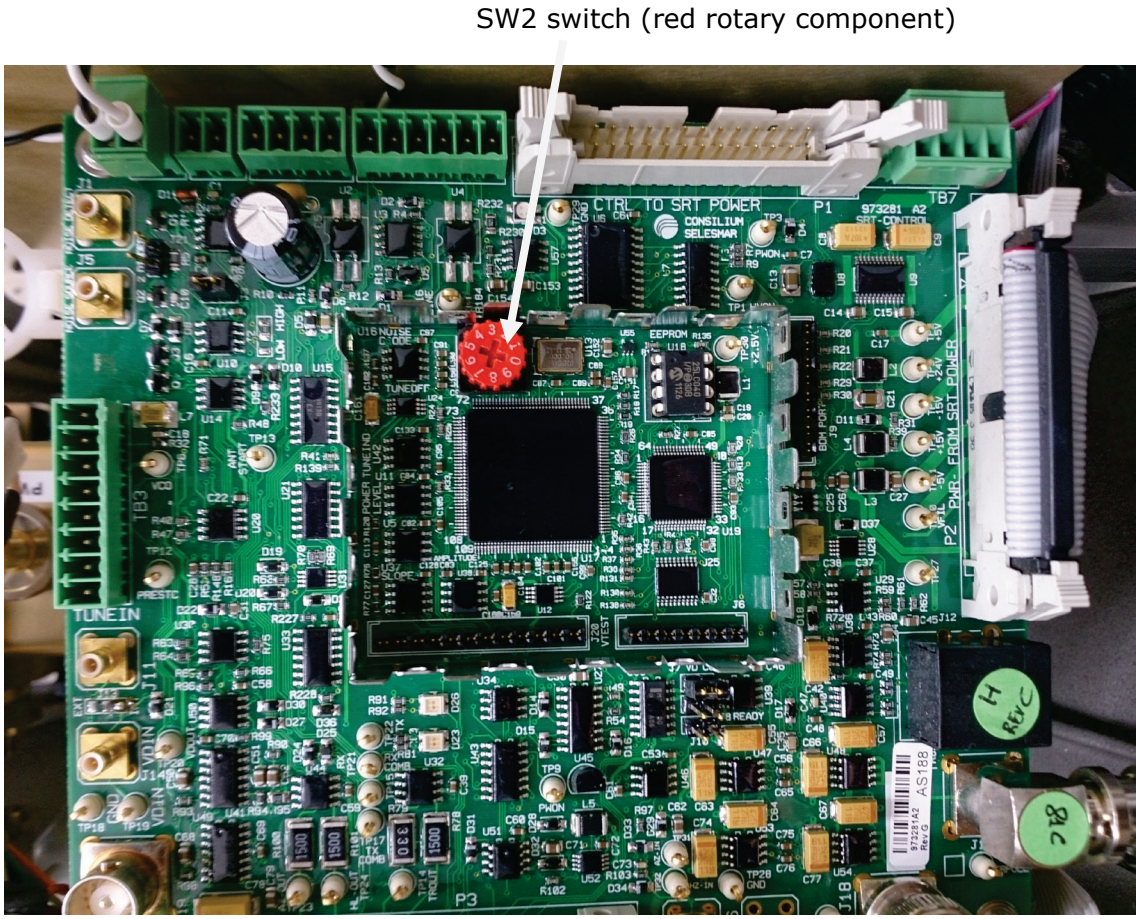
Safety Operations

During normal operation (unit closed), the unit can be quickly disconnected from the main power line, switching OFF the main circuit breaker located on the electric switchboard.

During maintenance (unit opened) it is possible to turn on the unit, by setting the SERVICE MODE to SW2 switch, mounted on the SRT control PCB (see next page). This switch is connected in parallel with the relay, controlled by the POWER ON command, and during normal operation must be set to NORMAL. During maintenance, in order to prevent RTM occasional turning-on it is better to disconnect and insulate, momentarily, PWON terminal from the relevant terminal board.

NOTE

Main power line is always present on terminal board and on fuses



SRT control PCB

Safety Summary

The following general safety precautions are not related to any specific procedure and therefore do not appear elsewhere in this technical manual. These are recommended precautions that personnel must understand and apply during most phases of operation and maintenance.

KEEP AWAY FROM ANY LIVE CIRCUITS!

Operating personnel must at all times observe all safety regulations.
Do not replace components or make adjustments inside the unit with the high voltage supply turned ON. Under certain conditions, dangerous potentials may exist when the power breaker is in OFF position, due to charges retained by capacitors. To avoid danger and casualties, always remove power and discharge to ground a high voltage circuit before touching it.

DO NOT SERVICE OR ADJUST YOURSELF!

Under no circumstances should any person initiate servicing or adjusting the unit except in the presence of authorized personnel.

RESUSCITATION

Personnel working with or near high voltage should be familiar with modern methods of resuscitation. Such information may be obtained from the Bureau of Medicine and Surgery or equivalent.

Warning Information

The following warning signs appear in this technical manual. To point out their importance, they are repeated here for emphasis:

WARNING

USE EXTREME CARE WHEN WORKING ON THE UNIT ONCE THE COVER HAS BEEN OPENED. THE MAGNETRON ASSEMBLY OPERATES AT HIGH VOLTAGES THAT MAY CAUSE FATAL INJURIES

WARNING

BE AWARE OF HIGH VOLTAGE CAPACITORS. IT IS NECESSARY TO SHORT-CIRCUIT THEIR LEADS BEFORE PERFORMING ANY MAINTENANCE ACTION ON THEM.

WARNING

ON THE ELECTRIC SWITCHBOARD, SET THE POWER BREAKER DEDICATED TO THE PRESENT EQUIPMENT TO “OFF”, AND ATTACH A SIGN, READING: “WORK IN PROGRESS! DO NOT SWITCH ON!”

WARNING

USE EXTREME CARE WHEN WORKING ON THE EQUIPMENT ONCE THE UNIT HAS BEEN OPENED. THE MAGNETRON ASSEMBLY OPERATES AT HIGH VOLTAGES THAT MAY CAUSE FATAL INJURIES.

WARNING

SET MAIN LINE BREAKER TO OFF BEFORE REPLACING ANY FUSE. FUSES ARE AT VOLTAGE LEVELS, WHICH MAY CAUSE FATAL INJURIES.

CHAPTER 1
INSTALLATION AND SETTINGS

1.1 Guidelines for the installation of shipborne radar equipment

Information provided by radar is of vital importance for navigators and the safe navigation of ships.

Special care should be taken to ensure correct installation of the radar, in order to ensure the performance of the radar system.

Correct location of the radar antenna is an important factor the performance of the radar system. Interference, either by reflecting constructions or other transmitters, may heavily reduce the radar performance by creating blind sectors, clutter on the radar display or generation of false echoes.

1.2 Interference

Proper care should be taken with regard to the location of radar antennas relative to other antennas which may cause interference to either equipment. The location of the antenna should comply with the following:

The radar antenna should be installed at a safe distance from interfering high-power energy sources and other transmitting and receiving radio antennas.

The lower edge of the radar antenna should be a minimum of 50 cm above any safety rail.

Radar antennas in close proximity should have a minimum vertical elevation separation angle of 20° and a minimum vertical separation of 1 m where possible.

1.2.1 Location relative to masts, funnels and other constructions

Proper care should be taken with regard to the location of radar antennas relative to masts, funnels and other constructions.

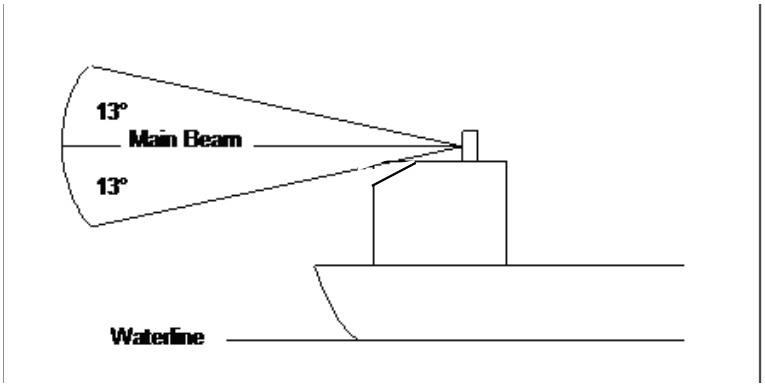
The location of the antenna should comply with the following:
The antenna should generally be mounted clear of any structure that may cause signal reflections.
Ensure that any support or other obstacles are clear of the rotation of the antenna (see specific antenna outline drawing for rotation radius).
Install antenna and turning unit so that the installation complies with the compass safe distance for the equipment.

1.2.2 Blind sectors and range

To ensure full benefit from the radar, it is vitally important for the OOB that horizontal and vertical blind sectors for the radar antennae are minimized. The objective is to see the horizon freely through 360°, or as close to as possible.

For all radar systems and where practical, a line of sight from the radar antenna to the bow of the ship should hit the surface of the sea at no more than 500 m or twice the ship length, depending which value is smaller. This goes for all load and trim conditions.

The radar antenna should be located in an elevated position to permit maximum target visibility.



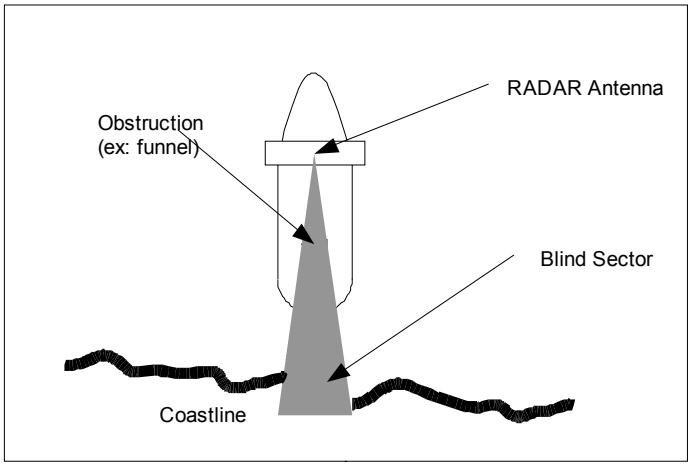
Ideal Radiation Plane

Blind sectors should be kept at a minimum, and should not occur in an area of the horizon from right ahead to 22.5° abaft the beam to either side.

Note: Any two blind sectors separated by 3° or less should be treated as one blind sector.

Individual blind sectors of more than 5°, or a total of blind sectors of more than 20°, should not occur in the remaining area, excluding the area in the above subparagraph (e).

For radar installations with two radar systems, where possible, the antennas should be placed in such a way as to minimize the blind sectors.



All installations should facilitate protection of equipment from damage, including cabling.

Safe service access should be provided using service platforms where necessary, having a minimum size of 1 m^2 at a suitable height and with a safety rail of suitable height.

Consideration should be given to the compass safety distance, as supplied by the manufacturer, when positioning equipment units.

The design of the mounting platform for the antenna and antenna pedestal should take into account the vibration requirements of resolution A.694(17) and furthermore defined by IEC 60945. In addition to vibration, the design of the mounting platform should consider shock and whiplash due to conditions at sea.

1.2.3 Interaction with sea and false echoes

Considerations of interaction with the sea imply that the radar antenna should be only as high as necessary to clear major objects, and as high to be consistent with other requirements regarding acceptable horizon and target detection range. The location of the antenna should minimize sea clutter returns and the number of multi-path nulls.

1.2.4 Cables and grounding

Cables and grounding should comply with the following:

Cable screens, especially coaxial cable screens, should be installed according to manufacturer's documentation.

The cables should be kept as short as possible to minimize interference and attenuation of the signal.

All cables between antenna and radar system units should be routed as directly as possible, consistent with consideration for other equipment, in order to reduce electromagnetic interference effects. Cables should not be installed close to high-power lines, such as radar or radio-transmitter lines.

Crossing of cables should be done at right angles (90°) to minimize magnetic field coupling.

All outdoor installed connectors should be waterproof by design to protect against water penetration into the cables.

Cables and microwave transmission lines should be handled carefully and be without sharp bends.

Cables and microwave transmission lines should be installed with sufficient physical separation, as defined in the manufacturer's documentation.

1.2.5 Radar controls and display

If the control panel is a separate unit, the functionality of the radar controls

should be available for the mariner at all workstations where a radar display is available.

The orientation of the display unit should be such that the user is looking ahead. The lookout view should not be obscured and the ambient light should cause minimum degradation on the display screen in accordance with MSC/Circ.982.

WARNING

LONG TRANSMISSION LINES CAN AFFECT THE RADAR PERFORMANCE. THE SYSTEM HAS BEEN TESTED WITH 20 M LENGTH FROM TRANSCEIVER TO ANTENNA PEDESTAL, CONSIDER THAT TRANSMITTED/RECEIVED POWER ARE HALVED FOR EVERY 10 MS ADDED (EX: +20 M = -6DB SIGNAL/NOISE).
CLEARLY THIS AFFECTS DETECTION FOR FAR TARGETS AND FOR SMALL/LOW REFLECTIVITY ONES LIKE SAILBOATS.
HIGHEST MAST POSITION IS GOOD FOR LONG RANGE DETECTION BUT IT AFFECTS HEAVILY THE DETECTION IN SEA CLUTTER. FOR OPTIMAL DETECTION IN SEA CLUTTER SUGGESTED ANTENNA HEIGHT FROM SEA LEVEL IS APPROX. 20 M.
USUALLY THE CONTRADICTORY SPECIFICATIONS ARE SOLVED WITH INSTALLATION OF MORE THAN ONE ANTENNA, FOR EXAMPLE ONE AT 30 M FOR LONG RANGE DETECTION AND ONE AT 20 M FOR OPTIMAL DETECTION OF LOW INTENSITY ECHOES IN SEA CLUTTER.

WARNING

ONLY ELECTRONIC POSITION FIXING SYSTEMS (EPFS) APPROVED IN ACCORDANCE WITH THE REQUIREMENTS OF THE IMO IN RESOLUTION MSC.112(73) SHALL BE CONNECTED TO THE ARGUS RADAR CONSOLE.

WARNING

ACCORDING THE IMO STANDARD, A GROUND SPEED SENSOR IS REQUIRED TO BE CONNECTED TO THE ARGUS CONSOLE.
IT IS ALLOWED TO USE AN ELECTRONIC POSITION FIXING SYSTEM (EPFS) APPROVED IN ACCORDANCE WITH THE REQUIREMENTS OF THE IMO IN RESOLUTION MSC.112(73) OR AN ALTERNATIVE TWO DIMENSIONAL GROUND STABILISING SDME IN COMPLIANCE WITH IMO RESOLUTION MSC.96(72)

WARNING

THE RADAR UNIT IS PROVIDED WITH A SAFETY SWITCH, WHICH DISABLES ANTENNA ROTATION DURING MAINTENANCE OPERATIONS AND AVOIDS HIGH VOLTAGE DAMAGE. ALWAYS TURN THE SAFETY SWITCH "OFF", WHENEVER ADVISED IN THIS MANUAL (FOR INSTANCE, BEFORE PERFORMING ANY MAINTENANCE OR INSTALLATION PROCEDURE). IGNORING SAFETY SWITCH OPERATION MAY PRODUCE HAZARD OF ELECTROCUTION AS WELL AS OTHER SEVERE INJURES

1.3 System Specifications

1.3.1 Dimension and Weight

See outline drawings

1.3.2 Power

Power supply	Single phase 220 or 115 Vac +/- 15% 50/60 Hz

Power consumption (estimated)	
Monitor M5024	35 W (+ 5 W power supply)
Monitor M5019	30 W (+ 5 W power supply)
Monitor M5016	25 W (+ 5 W power supply)
Monitor 26" Hatteland 16/9	120 W
Monitor 24" Hatteland	110 W
Core + Keyboard	40 W
Monitor + Core + Keyboard	65 W

1.3.3 Environmental Data

Operating temperature	-15°C / +55°C
Storage temperature	-25°C / +70°C
Relative humidity	Up to 95% at +40°
Water resistance, Salt spray, Vibrations etc.	as per IEC 60945

1.4 Input/Output Requirements

The parameters with tolerances are included with each of the inputs listed.

Table 1.4.1 - Summary of the Input/Output Requirements

Feature	Characteristics	
Power (see also section 1.3.2)	Voltage: Consumption:	Single phase 110 to 230 Vac ±15%, 50/60 Hz ±6% 50 VA
Environmental Conditions	Operating: Storage:	Temperature -15°C to +55 °C Temperature -20°C to +60 °C
Gyrocompass	Synchro:	. Voltage value: 50 ÷ 115 Vac ±10% (reference) . 50/60 Hz or 300/400 Hz . Gear ratio: 1:360, 1:180, 1: 90, 1:36
	Stepper:	. Voltage value: 15 to +100 V positive (Vef) -15 to -100 V negative (Vef) . Gear ratio: 1:360, 1:180, 1: 90, 1:36
	Stepper rectified:	. Voltage value: 100 Vac (Vef) . Frequency: 50/60 Hz or 300/400 Hz ±6% . Gear ratio: 1:360, 1:180, 1: 90, 1:36
	Serial:	. RS422 standard FNMEA or RS232 . Load: ≥ 7 KΩ, terminated 120 Ω
Speed Log	Mechanical input:	. PRR: 100 pulses/NM, 200 pulses/NM, 400 pulses/NM . Input type: diode isolated, pull-up . pulse width: 1 ms (min) . Load: ≥ 2.7 KΩ . Threshold: +10 V (typ)
Speed For	Electronic input (switch):	. PRR: 120 pulses/m, 20000 pulses/NM . Load: ≥ 1 KΩ . Pulse width: 0.1 µs (min) . Voltage: TTL to 15V (typ)
Speed Serial	Electronic input (serial):	. Input type: RS422 standard NMEA or RS 232 . Load: ≥ 3 KΩ, terminated 120 Ω
System Failure (FAIL) TB1 (pin 5-6)	Relay output NC	Closed when the system is in failure or switched off - Max 125 V 30 W load
Danger Target (DGT) TB1 (pin 3-4)	Relay output NC/NO configurable	Active when a Radar Target or AIS is dangerous - - Max 125 V 30 W load
Dead Man Alarm Reset (DNA) TB1 (pin 1-2)	Relay output NC/NO configurable	Active when an action is made on the control panel - Max 125 V 30 W load
Video and Combined data without ALPHA Expansion or CH3 and CH4 with this card		. Voltage value: 0,8 to 1,5 Vpp adjustable . Load: ≥ 1 KΩ, terminated 75 Ω

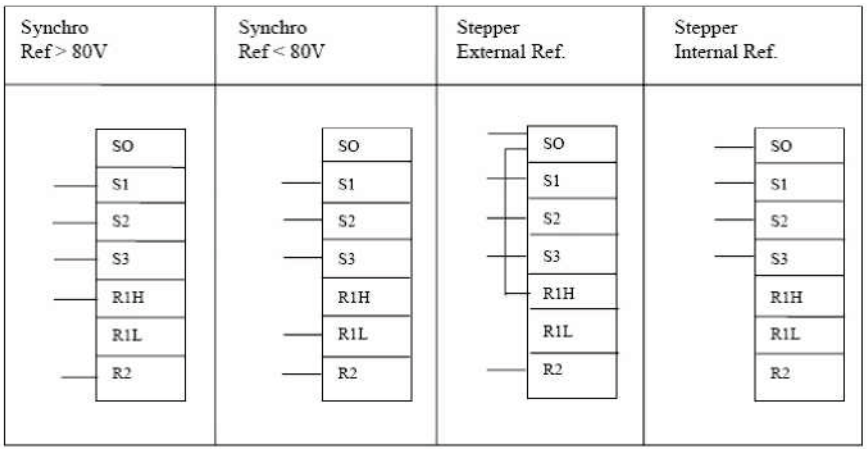
Feature	Characteristics	
Video and data with Alpha Expansion CH1 and CH2: (Optional)		
Video:	Polarity: Amplitude: Load: Bandwidth:	. Positive or negative . 1 to 4 Vpp adjustable . Load: ≥ 1 KΩ, terminated 75 Ω . 24 MHz (-3 dB)
Trigger:	Polarity: Amplitude: Load: PRF: Pulse width:	. Positive or negative . TTL to 40 V (peak) . Load: ≥ 1 KΩ, terminated 75 Ω . 300 to 4000 Hz . 50 ns (min.)
Serial Interface:	Signal Standard:	. RS232 or RS422 . Load: ≥ 3 KΩ, terminated 120 Ω
Antenna Rotation	Rotation rate:	. 15 to 60 RPM
Data	Device type:	
	- Bearing	. Voltage value: 4 to 50 V . 128 or 132 pulses per antenna revolution . Load: ≥ 2 KΩ
	- Encoder	. Voltage value: 4 to 50 V . 1024 or 4096 pulses per antenna revolution . Load: ≥ 2 KΩ
Heading line	Voltage value:	. 4 to 50 V
	Load:	. Load: ≥ 2 KΩ
	Pulse width:	. ≥ 0,1 mS and < 45°
	Polarity:	. Positive or negative or bipolar

1.5 Analogue Gyro compass (Synchro or Stepper)

The gyro signals are connected to TB14 on the Alpha PCB. There are several connection possibilities depending on type and reference voltage of the gyro.

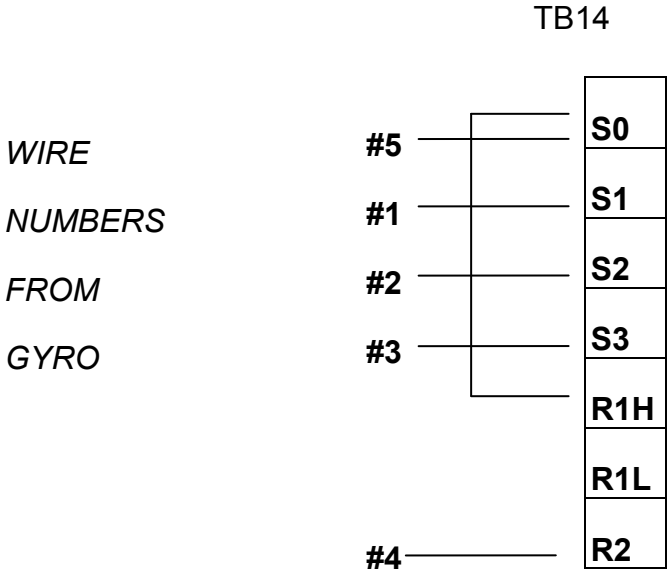
Refer to the drawing below for the relevant configuration for Synchro and Stepper.

Fig 1 For Argus (ALPHA PCB) connect to TB14.



Note: Connection with stepper gyro full wave rectified signal (SPERRY MK-37, MK-20)

1. Close the jumpers P10, P13, P15 on the Alpha PCB;
2. make the interconnection to TB4 on the Alpha PCB as follow:



3. Follow the configuration instructions described in Chapter 3
4. Check the phases status through the LED on the Alpha PCB.

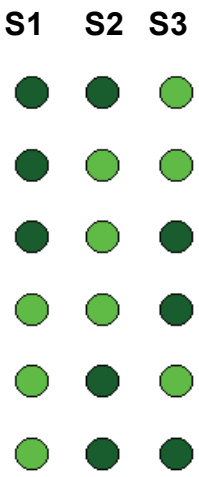
The three phases are given by the gyro with a 3 bit Gray code. The purpose of this code is to detect the increment of the value and its sign; its most important characteristic is that only one of the three bits at the time can change and in this application (normally is not a characteristic of the Gray code), the 3 bits cannot have all the same level. To give a quick look to the Gray code see the four green LED on the Alpha:

1. The first one next to red LED is D33 and it indicates the first phase (S1).

2. The second one is D34 and it is the second phase indicator (S2).
3. The third one is D35 and it indicates the third phase (S3).
4. The last one is D36 and it is to indicate the Reference.

Now that the LEDs are individuated, move the gyro or in any way simulate a steering and the three LEDs (S1, S2 and S3) will start to change their state and it will be easy to observe that they will never be “all on” or “all off”; their state will change one at a time.

Gyro Phases combinations in Gray code



WARNING

THE GYRO INTERFACE SHOULD BE CONFIGURED CORRECTLY ACCORDING TO TYPE OF SENSOR CONNECTED, OTHERWISE LEVELS AND LED SIGNALS WILL BE INCORRECTLY LIGHTED, ALSO WHEN THE SIGNALS ARE AVAILABLE.

1.6 Serial Gyro

A Standard or Fast NMEA Gyro can be connected to the Alpha PCB TB9

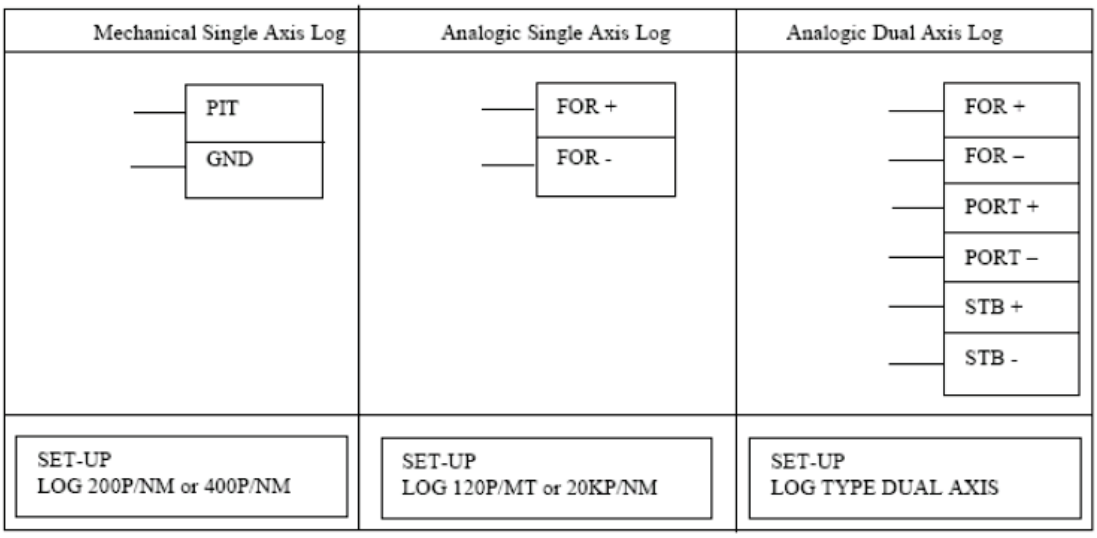
Connect it according to guidelines defined in Chapter 2 Serial Interfaces.

WARNING

THE HEADING SENSOR, A GYRO EQUIPMENT OR EQUIVALENT, SHOULD BE ABLE TO SUSTAIN A RATE OF TURN UP TO 20°/S ACCORDING TO IMO RESOLUTION MSC.192(79) AND MSC.116(73) FOR THD DEVICES.
IF THE INTERFACE IS ANALOGUE THE MINIMUM TURN RATE SHOULD BE 12°/S.
FOR A DIGITAL INTERFACE THE HEADING REFRESH SHOULD BE MORE THAN 20 HZ, UP TO 50 HZ.
IF THE GYRO UPDATE RATE IS UNDER THE PREVIOUS STATED VALUES THE TRACKING PERFORMANCE CAN BE SERIOUSLY DEGRADED WITH INCREASING ERRORS ON TARGET VECTOR DURING THE OWN SHIP CHANGE OF COURSE.

1.7 Speed LOG

Speed log with analogue signal is connected to TB14 on the Alpha PCB. There are several connections depending on the type of log installed. Most single axis analogue speed logs are shorting-type (relay contact closure), in this case the signal shall be connected between PIT and GND on TB14.



Speed log with NMEA output can be connected to Alpha PCB input TB2. See the serial interface chapter for accepted sentences.

1.8 EPFS

The EPFS (Electronic Position Fixing System) signal is connected to TB3 on the Alpha PCB.
When connected to an EPFS, the TB3 output sends relevant data for INS and ECDIS.

NOTE
Supported EPFS equipment must follow the IMO recommendation MSC.114(73)

1.9 AIS

The AIS signal is connected to TB8 on the Alpha PCB.
It's possible to receive RS422 or RS232 standard signal only at 38400 bps.
The sentences accepted are: AIALR, AIVDM and AIVDO.

NOTE
It is also possible to connect the output from the RADAR to the AIS device, to acknowledge the alarms coming from AIS from the RADAR interface. Normally, the AIS equipment has only one input available, so that only one RADAR can be connected to it and only one will be able to acknowledge the alarms. This output is on the same serial port TB8 with only one sentence generated: AIACK

The same output is the source for tracking data sentences TTD and TLB.

NOTE
Supported AIS equipment must follow the IMO recommendation A.917(22)

1.10 VDR Connection

To connect a VDR System to the Argus Radar, use the VGA Output on the Core Unit (Alpha Assy). The maximum distance from the Unit to the VDR depends on the level of the Video signal output of the cable in use. See the following table for distances regarding function of cable type.

Cable	Video 1280x1024 Distance (m)	Video 1600x1200 Distance (m)	Video 1920x1200 (26" wide screen) Distance (m)
RG75	10	8	10
RG59	25	20	25
M202	25	20	25
M203	35	30	35
RG11	40	30	40
CT100	50	40	50
CT125	60	45	60

Table 1.10.1 – VDR Connection

NOTE

- Supported VDR equipment must follow the IMO recommendation A.861(20)

- The VDR outlet is completely different from the DVI outlet to which the monitor is connected

Monitor synchronism timings according to the resolution

Resolution	1280x1024	1366x768	1600x1200	1920x1080	1920x1200
Dot Clock	110 MHz	72 MHz	110 MHz	144 MHz	130 MHz
Horizontal Period	15.56 uS	21.75 uS	16.36 uS	14.7 uS	16 uS
Horizontal Sync	1.67 uS	469 nS	0.908 uS	236 nS	246 nS
Horizontal Front Porch	392 nS	916 nS	416 nS	458 nS	336 nS
Horizontal Back Porch	1.86 uS	1.388 uS	496 nS	694 nS	652 nS
Vertical Period	16.41 mS	17.53 mS	19.96 mS	16.48 mS	19.76 mS
Vertical Sync	46.4 uS	87 uS	164 uS	58 uS	96 uS
Vertical Front Porch	15.6 uS	87 uS	48.8 uS	58.8 uS	48 uS
Vertical Back Porch	410 uS	652 uS	116 uS		418 uS

Table 1.10.2 – Monitor timings

1.11 Radar Console Failure Output

For installation where a continuous check of the radar console operability is mandatory, a failure output is available.
The FAIL output is located on TB1 on the Alpha PCB and it is a NC contact that can supply up to 200 mA of current (see Input/Output specification at this Chapter's introduction).
A special electronic circuit on the Antares PCB acts continuously as a watchdog to detect any operational failure that can cause a processor malfunction.
Should a failure occur or the system is powered-off, the contact switches to closed condition.

1.12 Configuration Links Table

1.12.1 Antares PCB Links:

Function	Ref.	Link Name	Description	Factory Preset
BDM	J8	BDM Enable B	Normally Open	Open
	J11	BDM Enable A	Normally Open	Open
Restore	J7	SW	If closed at startup, the default programs will not start and the upgrade ÷ restore programs will be run.	Open

1.12.2 Alpha PCB Links:

Function	Ref.	Link Name	Description	Factory Preset
Video	P7	VD1 Termination	Link closed when the Argus is standalone or the last equipment on the Video chain	Close
	P12	VD2 Termination	Link closed when the Argus is standalone or the last equipment on the Video chain	Close
	P2	422 Termination	Link closed when the Argus is standalone on 422 serial communication or the last equipment on 422 serial communication chain	Open

Function	Ref.	Link Name	Description	Factory Preset
Serial	P3	FNMEA 1 Termination	Link closed when the Argus is standalone on 422 serial communication or the last equipment on 422 serial communication chain	Open
	P4	FNMEA 2 Termination	Link closed when the Argus is standalone on 422 serial communication or the last equipment on 422 serial communication chain	Open
	P5	FNMEA 3 Termination	Link closed when the Argus is standalone on 422 serial communication or the last equipment on 422 serial communication chain	Open
	P8	232+422 / 1 Termination	Link closed when the Argus is standalone on 422 serial communication or the last equipment on 422 serial communication chain	Open
	P9	232+422 / 2 Termination	Link closed when the Argus is standalone on 422 serial communication or the last equipment on 422 serial communication chain	Open
	P11	232 / RX7 Inversion	Set this link to configure serial polarity	1-2
	P14	232 / RX8 Inversion	Set this to configure serial polarity	1-2
Gyro	P10	S3 Gyro set	Normally open, close in case of Sperry MK20 or MK37	Open
	P13	S2 Gyro set	Normally open, close in case of Sperry MK20 or MK37	Open
	P15	S1 Gyro set	Normally open, close in case of Sperry MK20 or MK37	Open
Alarm	P1	Dead Man Alarm	Set 1-2 normally open contact or 2-3 normally close contact	1-2
	P6	Danger Target Alarm	Set 1-2 normally open contact or 2-3 normally close contact	1-2

1.12.3 **Alpha Expansion PCB Links:**

Function	Ref.	Link Name	Description	Factory Preset
Video	P1	Video 1 Termination	Link closed when the Argus is standalone or the last equipment on the Video chain	Close
	P2	Video 2 Termination	Link closed when the Argus is standalone or the last equipment on the Video chain	Close
	P6	Video 3 Termination	Link closed when the Argus is standalone or the last equipment on the Video chain	Close
	P8	Video 4 Termination	Link closed when the Argus is standalone or the last equipment on the Video chain	Close
	P3	VD1 Level	Close in Serial Data Communication, open in Combined Video and with SRT Adapter Box installations	Close
	P4	VD2 Level	Close in Serial Data Communication, open in Combined Video and with SRT Adapter Box installations	Close
Trigger	P5	Trigger 1 Termination	Link closed when the Argus is standalone or the last equipment on the Trigger chain	Close
	P7	Trigger 2 Termination	Link closed when the Argus is standalone or the last equipment on the Trigger chain	Close

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CHAPTER 2
SERIAL INTERFACE SPECIFICATIONS

2.1 Serial Line 1, Heading

It is possible to receive RS422 or RS232 standard signal at 4800 or 38400 bps indifferently on TB9 (FNMEA 1). Note that the circuit is able to receive at 4800 and 38400 bps also with RS232 connection, but this is not a standard connection according to the IEC 61162-2 standard.

SCHEME 4
IN +
IN -
SHLD
OUT+
OUT-
GND

RS 422 Interface Listener Connection

+ IN	"A" Data Input
- IN	"B" Data Input
SHLD	"C" insulated Ground
Input Load	≥ 7 KΩ

RS 232 Interface Listener Connection

- IN	RX Data Input
SHLD and + IN	Insulated ground
Input Load	≥ 7 KΩ

This serial line is compliance with IEC 61162-1 and IEC 61162-2. Accepted sentences: THS and HDT

THS – True heading and status

NOTE
This sentence replaces the deprecated sentence HDT.

Actual vessel heading in degrees true produced by any device or system producing true heading. This sentence includes a “mode indicator” field providing critical safety related information about the heading data, and replaces the deprecated HDT sentence.

$--THS,x.x,a*hh<CR><LF>

- a — Mode indicator (see Note)
- x.x — Heading, degrees true

NOTE
Mode indicator. This field should not be null.

A = Autonomous

E = Estimated (dead reckoning)

M = Manual input

S = Simulator mode

V = Data not valid (including standby)

HDT – Heading true

Actual vessel heading in degrees true produced by any device or system producing true heading.

NOTE
This is a deprecated sentence which has been replaced by THS.

$--HDT, x.x, T*hh<CR><LF>

- x.x — Heading, degrees true

2.2 Serial Line 2, AIS

It is possible to receive RS422 or RS232 standard signal at 4800 and 38400 bps on TB8 (FNMEA 2). Note that the circuit is able to receive at 4800 and 38400 bps also with RS232 connection, but this is not a standard connection according to the IEC 61162-2 standard.

SCHEME 2
IN +
IN -
SHLD
OUT+
OUT-
GND

RS 422 Interface Listener Connection

+ IN	. "A" Data Input
- IN	. "B" Data Input
SHLD	. “C” insulated Ground
Input Load	. ≥ 7 KΩ

RS 232 Interface Listener Connection

- IN	. RX Data Input
SHLD and + IN	. Insulated ground
Input Load	- ≥ 7 KΩ

RS 422 Output Talker Connection

+ OUT	. "A" Data Output
- OUT	. "B" Data Output
GND	. “C” Ground
Output Drive	- 150 mA

This serial line complies to IEC 61162-1 and IEC 61162-2.
Accepted sentences: VDM, VDO and ALR.
Send sentences TLB, TTD and ACK.

VDM – AIS VHF data-link message

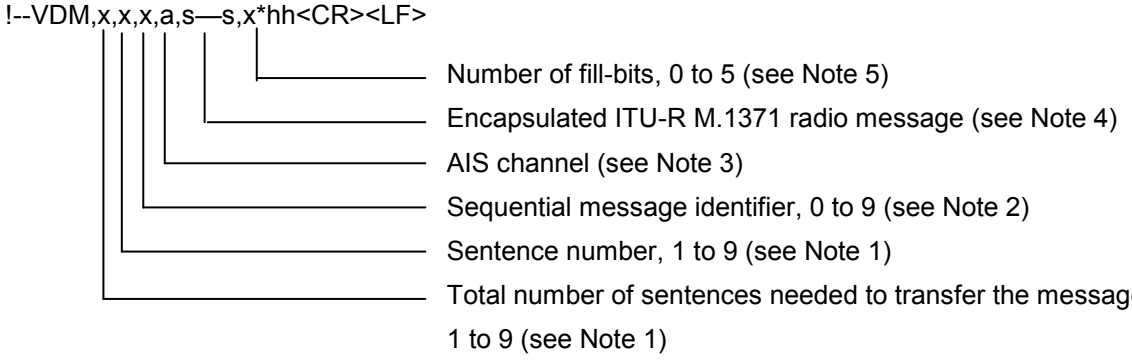
Defined in ITU-R M.1371 and as received on the VHF Data Link (VDL), using the “six-bit” field type. The structure provides for the transfer of long binary messages by using multiple sentences.

Data messages should be transmitted in as few sentences as possible. When a data message can be accommodated in a single sentence, then it shall not be split.

VDM – AIS VHF data-link message

Defined in ITU-R M.1371 and as received on the VHF Data Link (VDL), using the “six-bit” field type. The structure provides for the transfer of long binary messages by using multiple sentences.

Data messages should be transmitted in as few sentences as possible. When a data message can be accommodated in a single sentence, then it shall not be split.



NOTE 1

The length of an ITU-R M.1371 message may require the transmission of multiple sentences. The first field specifies the total number of sentences used for a message, minimum value 1. The second field identifies the order of this sentence in the message, minimum value 1. These cannot be null fields.

NOTE 2

The sequential message identifier provides a message identification number from 0 to 9 that is sequentially assigned and is incremented for each new multi-sentence message. The count resets to 0 after 9 is used. For a message requiring multiple sentences, each sentence of the message contains the same sequential message identification number. It is used to identify the sentences containing portions of the same message. This allows for the possibility that other sentences might be interleaved with the message sentences that, taken collectively, contain a single message. This should be a null field for messages that fit into one sentence.

NOTE 3

The AIS channel is indicated as either “A” or “B”. This channel indication is relative to the operating conditions of the AIS unit when the packet is received. This should be a null field when the channel identification is not provided. The VHF channel numbers for channels “A” and “B” are obtained by using a “query” (see 7.3.4) of the AIS unit for an ACA sentence.

NOTE 4

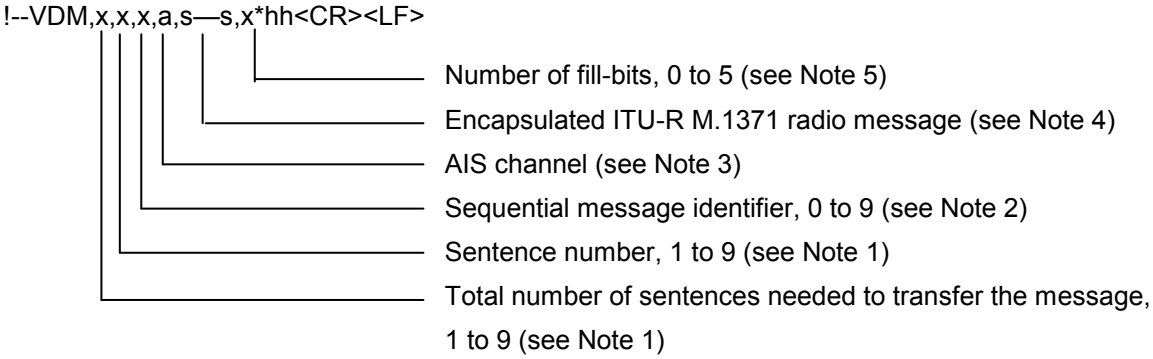
This field supports up to 60 valid characters. Under certain conditions, this field may support up to a maximum of 62 valid characters: 1) When the message can be transmitted using a single sentence, the sequential message identifier field is set to null allowing an additional valid character in this encapsulated field. 2) When the AIS channel field is set to null an additional valid character is allowed in this encapsulated field. 3) The maximum number of 62 valid characters is only possible when the conditions allow both the sequential message identifier and AIS channel fields is set to null.

NOTE 5

This cannot be a null field. See "x4" in 7.3.3.

VDO – AIS VHF data-link own-vessel report

This sentence is used to transfer the entire contents of an AIS unit's broadcast message packet, as defined in ITU-R M.1371 and as sent out by the AIS unit over the VHF data link (VDL) using the "six-bit" field type. The sentence uses the same structure as the VDM sentence formatter.

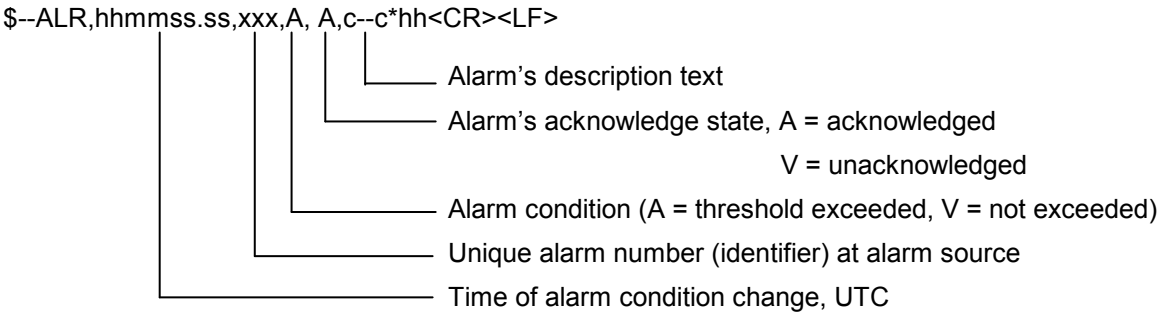


NOTES 1

To 5 See VDM sentence notes.

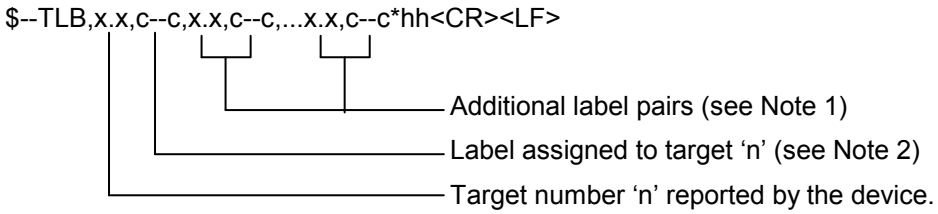
ALR – Set alarm state

Local alarm condition and status. This sentence is used to report an alarm condition on a device and its current state of acknowledgement.



TLB – Target label

Common target labels for tracked targets. This sentence is used to specify labels for tracked targets to a device that provides tracked target data (e.g. via the TTM – Tracked target message). This will allow all devices displaying tracked target data to use a common set of labels (e.g. targets reported by two radars and displayed on an ECDIS).



NOTE 1

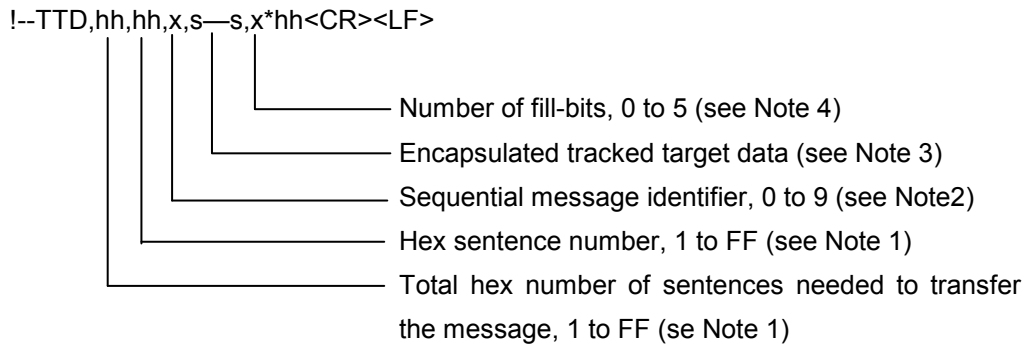
This sentence allows several target number/label pairs to be sent in a single message, the maximum sentence length limits the number of labels allowed in a message.

NOTE 2

Null fields indicate that no common label is specified, not that a null label should be used. The intent is to use a null field as a place holder. A device that provides tracked target data should use its ”local” label (usually the target number) unless it has received a TLB sentence specifying a common label.

TTD – Tracked target data

This sentence is used to transmit tracked radar targets in a compressed format. This enables the transfer of many targets with minimum overhead. New target labels are defined by the TLB sentence to reduce bandwidth use. Transmission of up to four targets in the same sentence is possible.



NOTE 1

The transfer of all tracked targets may require the transmission of multiple sentences. The first field specifies the total number of sentences used for a message, minimum value 1. The second field identifies the order of this sentence in the message, minimum value 1. These cannot be null fields.

NOTE 2

The sequential message identifier provides a message identification number from 0 to 9 that is sequentially assigned and is incremented for each new multi-sentence message. The count resets to 0 after 9 is used. For a message requiring multiple sentences, each sentence of the message contains the same sequential message identification number. It is used to identify the sentences containing portions of the same message. This allows for the possibility that other sentences might be interleaved with the message sentences that, taken collectively, contain a single message. This should be a null field for messages that fit into one sentence.

NOTE 3

The tracked target data structure is described below. One sentence may contain from one up to four structures of 15 characters in the same sentence. This field supports a maximum of 60 valid characters for messages transferred using multiple sentences.

NOTE 4

This cannot be a null field. See "x4" in description of encapsulation sentences in IEC 61162-1.Every target (tracked or AIS) is packed according to the structure below. Data is stored most significant bit first. Every message character is converted into six bits. The structure is encapsulated as 15 characters. The sentence may contain from one to four targets.

Parameter	Number of bits	Range and resolution	Description		
Protocol version	2	0 to 3	The protocol version shall always be set to zero for the structure defined below. Other values are reserved for future modification of this structure		
Target number	10	0 to 1 023	The target number associated with the label with corresponding number. Target number zero is reserved for no tracking target		
True bearing	12	to 359,9° Step 0,1°	North-up coordinate system 409,5° = invalid or N/A data		
Speed	12	to 409,4 kn Step 0,1 kn	See speed mode and stabilisation mode 409,5 kn = invalid or N/A data		
Course	12	to 359,9° Step 0,1°	See speed mode and stabilisation mode 409,5° = invalid or N/A data		
Heading (AIS target only)	12	to 359,9° Step 0,1°	Reported heading from AIS, north-up coordinate system 409,4° = invalid or N/A data 409,5° = no data, radar tracking target		
Tracked/AIS target status	3		Value	Radar	AIS
			000	Non-tracking	No target to report
			001	Acquiring target (not established)	Sleeping target
			010	Lost target	Lost target
			011	Reserved	Reserved
			100	Established tracking, no alarm	Activated target, no alarm
			101	Reserved	Reserved
			110	Established tracking, CPA/TCPA alarm	Activated target, CPA/TCPA alarm
			111	Established tracking, acknowledged CPA/TCPA alarm	Activated target, acknowledged CPA/TCPA alarm
Operation mode	1		0 = autonomous (normal) 1 = test target		
Distance	14	to 163,83 NM Step 0,01 NM	Distance to target 163,84 NM = invalid or N/A data		
Speed mode	1		0 = true speed and course 1 = relative speed and course		
Stabilisation mode	1		0 = over the ground 1 = through the water		
Parameter = reserved	2		Reserved for future use Always set to zero		
Correlation/association number	8	0 to 255	Number zero is reserved for no correlation/association Correlated/associated targets are assigned a common number		
TOTAL	90		90/6=15 characters		
N/A: Not available					

2.3 Serial Line 3, EPFS - GPS

It is possible to receive RS422 or RS232 standard signal at 4800 or 38400 bps indifferently on TB3 (FNMEA 3). Note that the circuit is able to receive at 4800 and 38400 bps also with RS232 connection, but this is not a standard connection according to the IEC 61162-2 standard.

SCHEME 3
IN +
IN -
SHLD
OUT+
OUT-
GND

RS 422 Interface Listener Connection

+ IN	"A" Data Input
- IN	"B" Data Input
SHLD	“C” insulated Ground
Input Load	≥ 7KΩ

RS 232 Interface Listener Connection

- IN	RX Data Input
SHLD and + IN	Insulated ground
Input Load	≥ 7KΩ

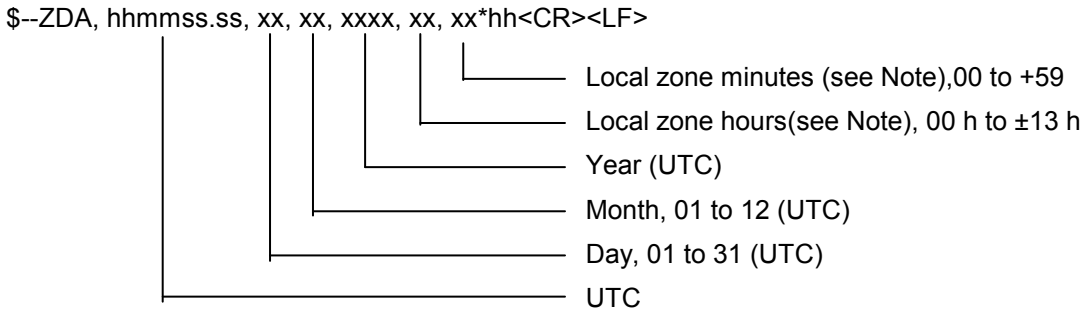
RS 422 Output Talker Connection

+ OUT	"A" Data Output
- OUT	"B" Data Output
GND	“C” Ground
Output Drive	150 mA

This serial line complies to IEC 61162-1 and IEC 61162-2.
Accepted sentences: ZDA, GLL, GGA, GNS, RMC, DTM and ACK.
Send sentences OSD, RSD and TTM.

ZDA – Time and date

UTC, day, month, year and local time zone.

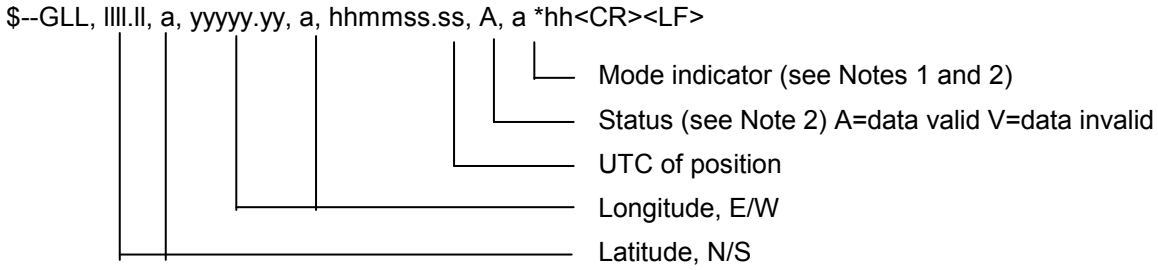


NOTE

Local time zone is the magnitude of hours plus the magnitude of minutes added, with the sign of local zone hours, to local time to obtain UTC. Local zone is generally negative for East longitudes with local exceptions near the International date line.

GLL – Geographic position – latitude/longitude

Latitude and longitude of vessel position, time of position fix and status.



NOTE 1

Positioning system mode indicator:

A = Autonomous

D = Differential

E = Estimated (dead reckoning)

M = Manual input

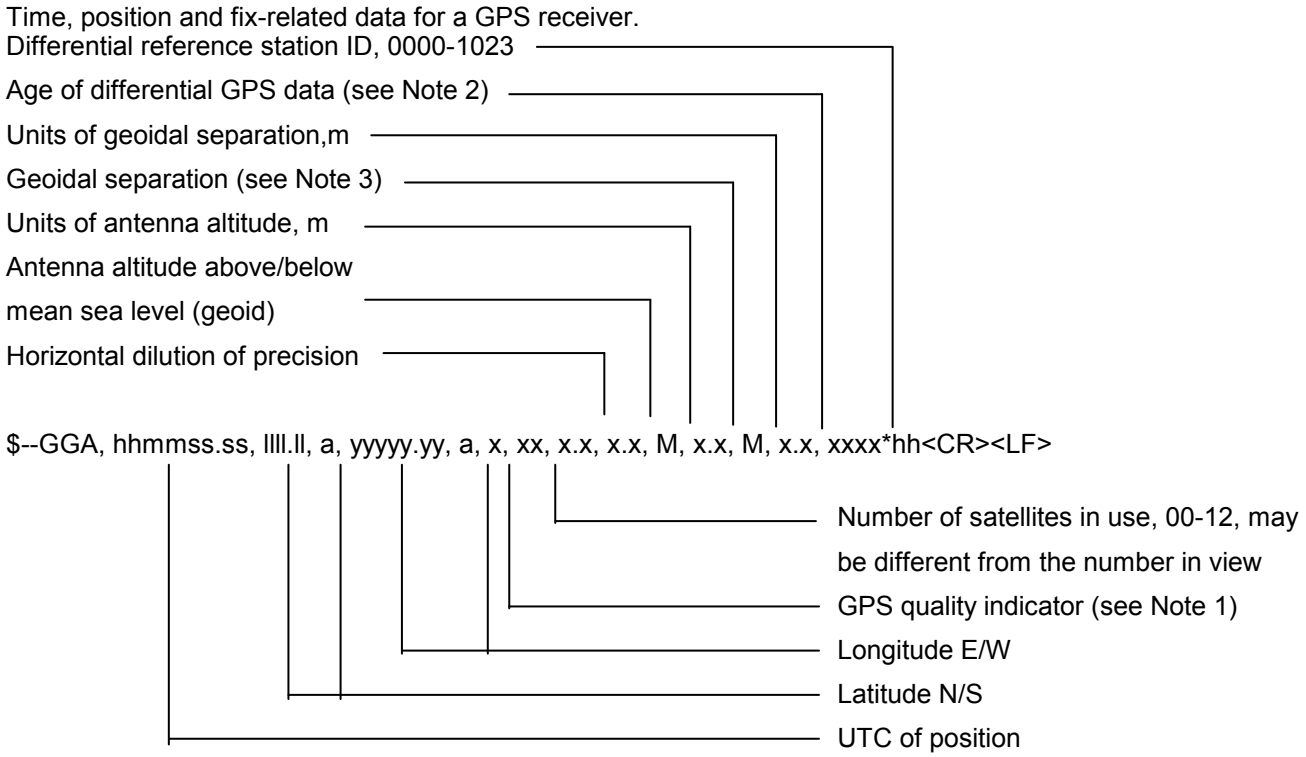
S = Simulator

N = Data not valid

NOTE 2

The mode indicator field supplements the status field (field 6). The status field should be set to V = invalid for all values of operating mode except for A = Autonomous and D = Differential. The positioning system mode indicator and status fields should not be null fields.

GGA – Global positioning system (GPS) fix data



NOTE 1

All GPS quality indicators in headings 1 through 8 are considered "valid". The heading "0" is the only "invalid" indicator. The GPS quality indicator field should not be a null field.

0 = fix not available or invalid

1 = GPS SPS mode

2 = differential GPS, SPS mode

3 = GPS PPS mode

4 = Real Time Kinematic. Satellite system used in RTK mode with fixed integers

5 = Float RTK. Satellite system used in RTK mode with floating solution

6 = Estimated (dead reckoning) mode

7 = Manual input mode

8 = Simulator mode

NOTE 2

Time in seconds since last SC104 type 1 or 9 update, null field when DGPS is not used.

NOTE 3

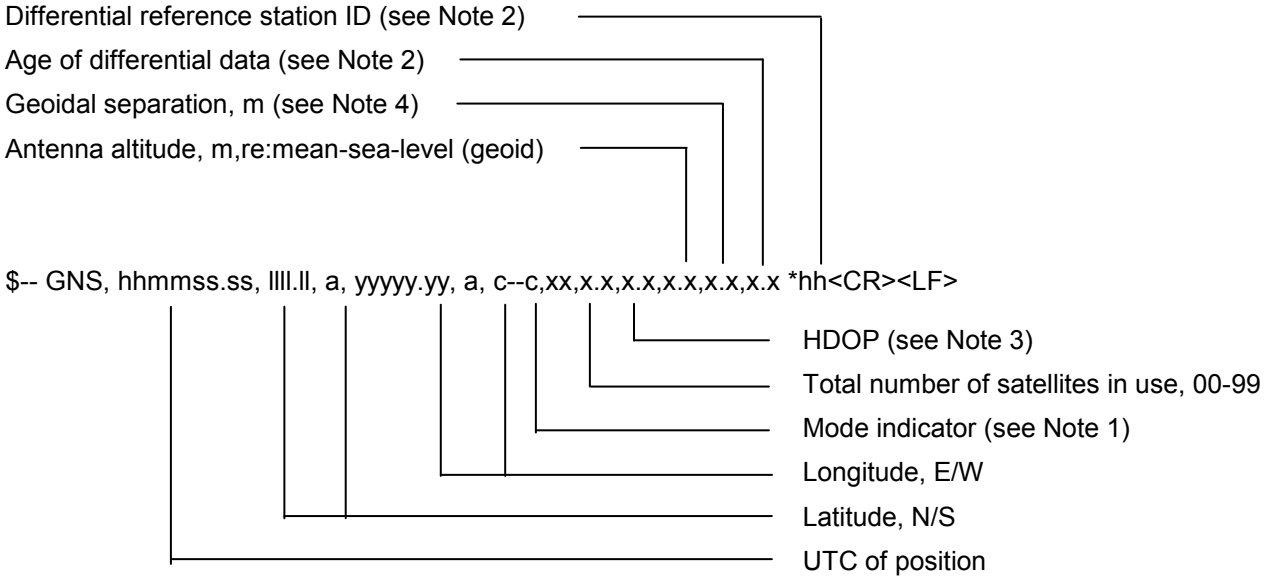
Geoidal separation: the difference between the WGS-84 earth ellipsoid surface and mean sea level (geoid) surface, " – " = mean sea level surface below the WGS-84 ellipsoid surface.

GNS – GNSS fix data

Fix data for single or combined satellite navigation systems (GNSS). This sentence provides fix data for GPS, GLONASS, possible future satellite systems and systems combining these. This sentence could be used with the talker identification of GP for GPS, GL for GLONASS, GN for GNSS combined systems, as well as future identifiers. Some fields may be null fields for certain applications, as described below.

If a GNSS receiver is capable simultaneously of producing a position using combined satellite systems, as well as a position using only one of the satellite systems, then separate $GPGNS, $GLGNS, etc. sentences may be used to report the data calculated from the individual systems.

If a GNSS receiver is set up to use more than one satellite system, but for some reason one or more of the systems are not available, then it may continue to report the positions using $GNGNS, and use the mode indicator to show which satellite systems are being used.



NOTE 1

Mode Indicator. A variable length valid character field type with the first two characters currently defined.

The first character indicates the use of GPS satellites, the second character indicates the use of GLONASS satellites. If another satellite system is added to the standard, the mode indicator will be extended to three characters; new satellite systems shall always be added to the right, so the order of characters in the mode indicator is: GPS, GLONASS, other satellite systems.

The characters should take one of the following values:

N = No fix. Satellite system not used in position fix, or fix not valid.

A = Autonomous. Satellite system used in non-differential mode in position fix.

D = Differential. Satellite system used in differential mode in position fix.

P = Precise. Satellite system used in precision mode. Precision mode is defined as: no deliberate degradation (such as selective availability), and higher resolution code (P-code) is used to compute position fix.

R = Real time kinematic. Satellite system used in RTK mode with fixed integers.

F = Float RTK. Satellite system used in real time kinematic mode with floating solution.

E = Estimated (dead reckoning) mode.

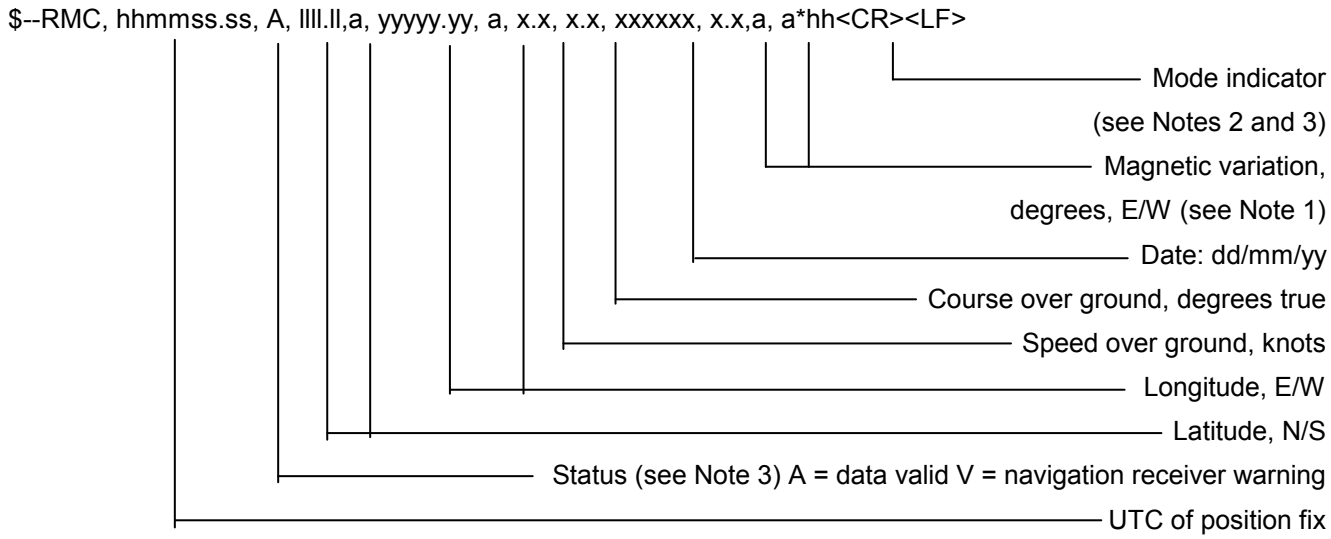
M = Manual input mode.

S = Simulator mode.

The mode indicator should not be a null field.

RMC – Recommended minimum specific GNSS data

Time, date, position, course and speed data provided by a GNSS navigation receiver. This sentence is transmitted at intervals not exceeding 2 s and is always accompanied by RMB when a destination waypoint is active. RMC and RMB are the recommended minimum data to be provided by a GNSS receiver. All data fields should be provided, null fields used only when data is temporarily unavailable.



NOTE 1

Easterly variation (E) subtracts from true course. Westerly variation (W) adds to true course.

NOTE 2

Positioning system mode indicator:

A = Autonomous mode

D = Differential mode

E = Estimated (dead reckoning) mode

M = Manual input mode

S = Simulator mode

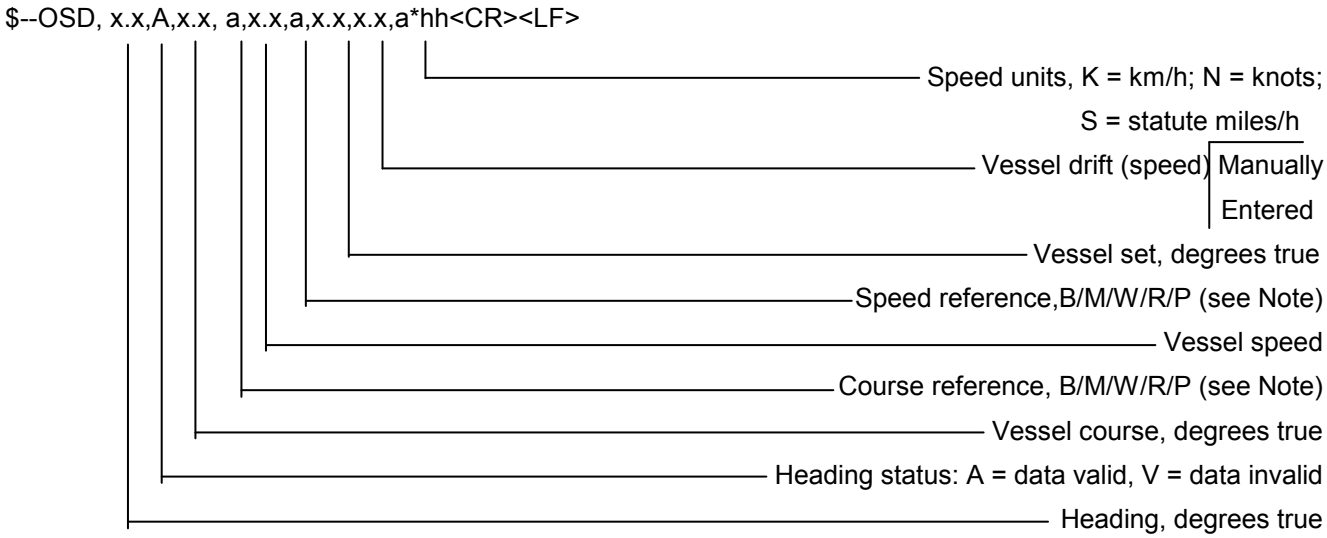
N = Data not valid

NOTE 3

The positioning system mode indicator field supplements the positioning system status field (field No. 2) which should be set to V = invalid for all values of mode indicator except for A = Autonomous

OSD – Own ship data

Heading, course, speed, set and drift summary. Useful for, but not limited to radar/ARPA applications. OSD gives the movement vector of the ship based on the sensors and parameters in use.



NOTE

Reference systems on which the calculation of vessel course and speed is based. The values of course and speed are derived directly from the referenced system and do not additionally include the effects of data in the set and drift fields.

B = bottom tracking log

M = manually entered

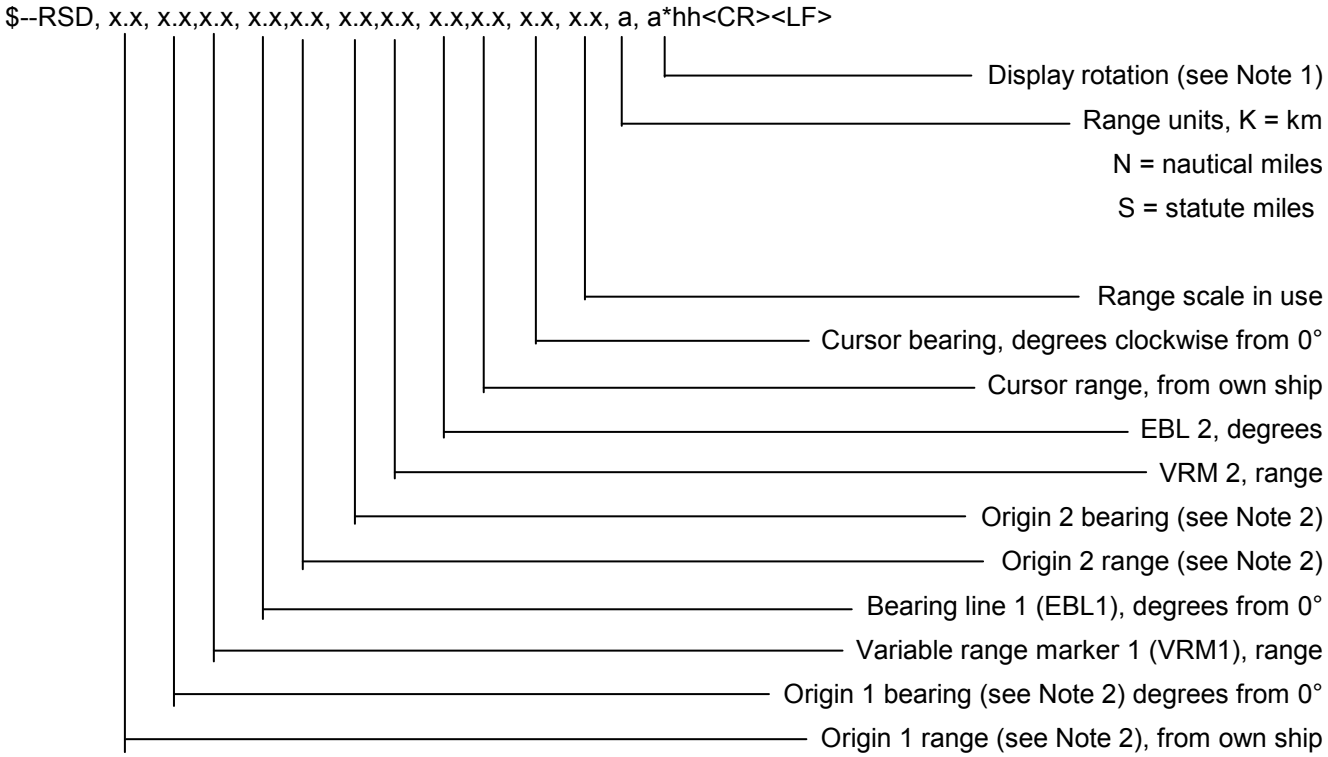
W = water referenced

R = radar tracking (of fixed target)

P = positioning system ground reference.

RSD – Radar system data

Radar display setting data.



NOTE 1

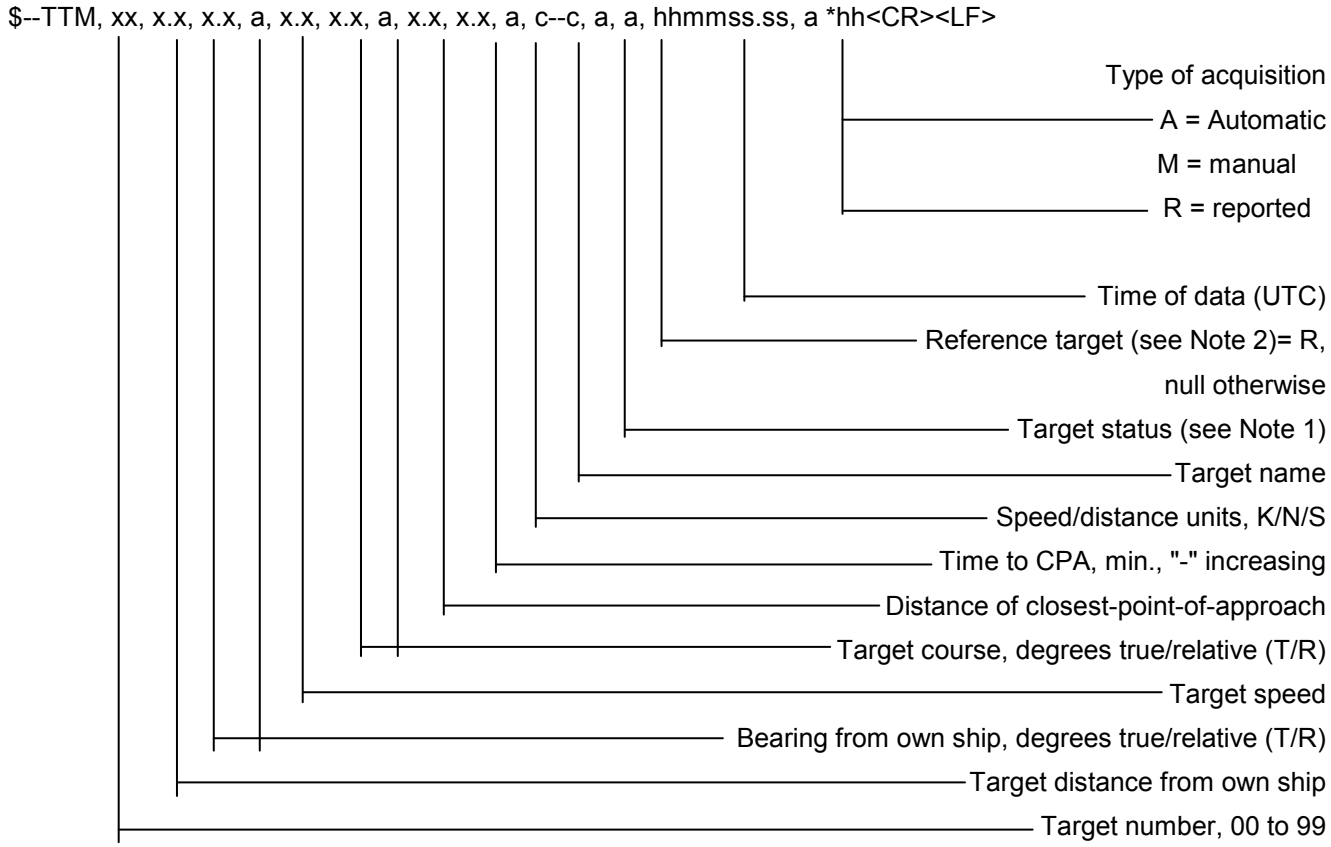
Display rotation:
C = course-up, course-over-ground up, degrees true
H = head-up, ship's heading (centre-line) 0° up
N = north-up, true north is 0° up

NOTE 2

Origin 1 and origin 2 are located at the stated range and bearing from own ship and provide for two independent sets of variable range markers (VRM) and electronic bearing lines (EBL) originating away from own ship position.

TTM – Tracked target message

Data associated with a tracked target relative to own ship's position.



NOTE 1 Target status:

L = Lost, tracked target has been lost

Q = Query, target in the process of acquisition

T = Tracking

NOTE 2 Reference

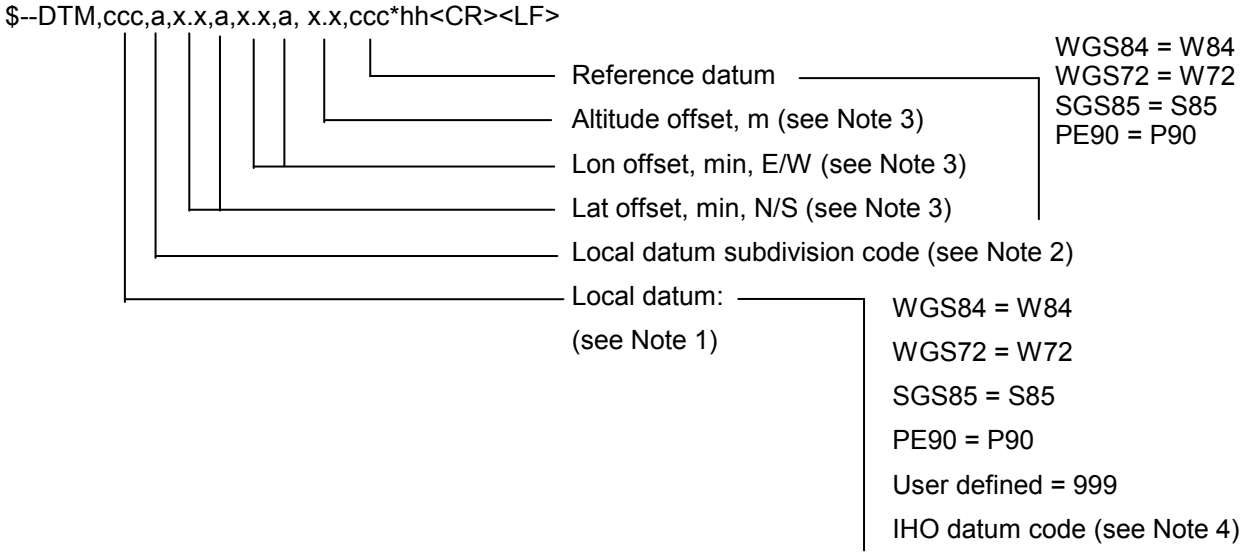
NOTE
All the position data sent out via TTM and TTD is always relative to the CCRP

DTM - Datum reference

Local geodetic datum and datum offsets from a reference datum. This sentence is used to define the datum to which a position location, and geographic locations in subsequent sentences, are referenced. Latitude, longitude and altitude offsets from the reference datum, and the selection of the reference datum, are also provided.

Cautionary notes: the datum sentence should be transmitted immediately prior to every positional sentence (e.g. GLL, BWC, WPL) which is referenced to a datum other than WGS84, the datum recommended by IMO.

For all datums the DTM sentence should be transmitted prior to any datum change and periodically at intervals of not greater than 30 s.



NOTE 1

Three character alpha code for local datum. If not one of the listed earth-centred datums, or 999 for user defined datums, use IHO datum code from International Hydrographic Organisation Publication S-60, Appendices B and C. Null field if unknown. This field should be set to 999 when manual offsets are entered and in use by the position fixing device.

NOTE 2

One character subdivision datum code when available or user defined reference character for user defined datums, null field otherwise. Subdivision character from IHO Publication S-60, Appendices B and C.

NOTE 3

Latitude and longitude offsets are positive numbers, the altitude offset may be negative. Offsets change with position: position in the local datum is offset from the position in the reference datum in the directions indicated:

Plocal datum = Pref datum + offset

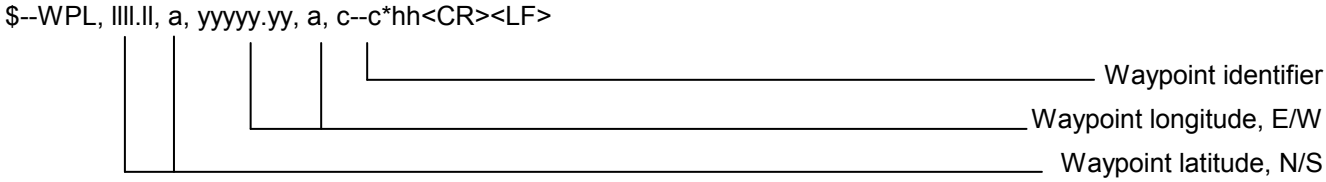
When field 1 contains a value of 999, these fields may not be null, and should contain the manually entered or user defined offsets.

NOTE 4

Users should be aware that chart transformations based on IHO S60 parameters may result in significant positional errors when applied to chart data.

WPL – Waypoint location

Latitude and longitude of specified waypoint.

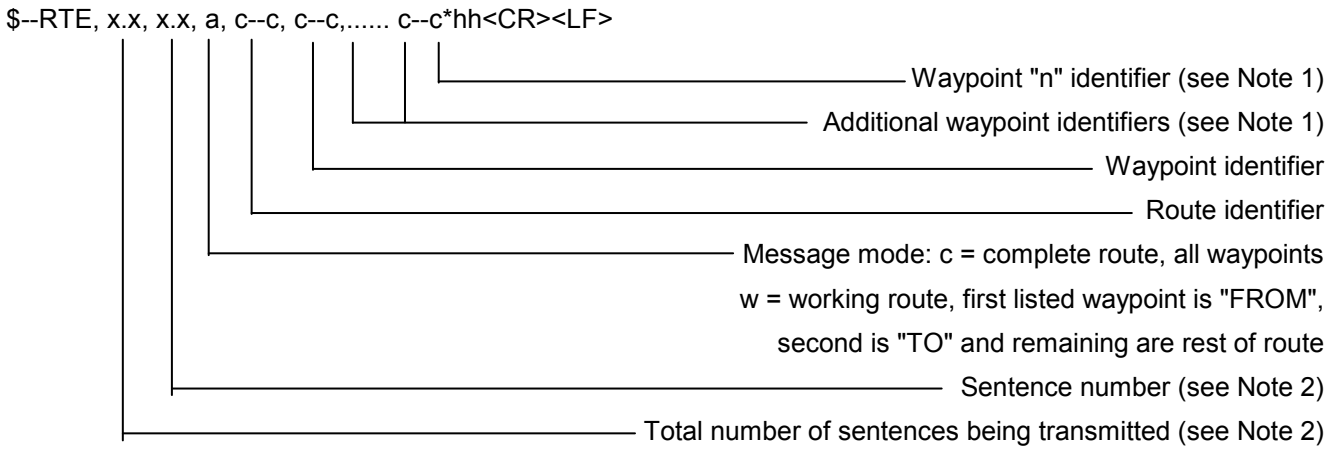


NOTE 1

Waypoints with name field are not accepted.

RTE – Routes

Waypoint identifiers, listed in order with starting waypoint first, for the identified route. Two modes of transmission are provided: "c" indicates that the complete list of waypoints in the route is being transmitted; "w" indicates a working route where the first listed waypoint is always the last waypoint that had been reached (FROM), while the second listed waypoint is always the waypoint that the vessel is currently heading for (TO) and the remaining list of waypoints represents the remainder of the route.



NOTE 1

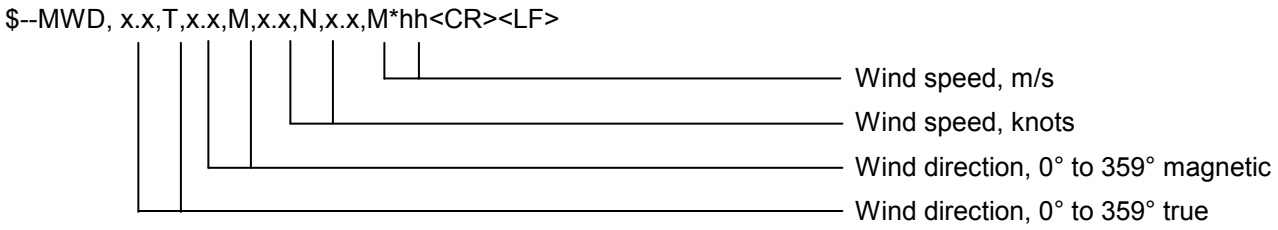
A variable number of waypoint identifiers, up to "n", may be included within the limits of allowed sentence length. As there is no specified number of waypoints, null fields are not required for waypoint identifier fields.

NOTE 2

A single route may require the transmission of multiple sentences, all containing identical field formats when sending a complex message. The first field specifies the number of sentences, minimum value = 1. The second field identifies the order of this sentence (sentence number), minimum value = 1. For efficiency, it is permitted that null fields be used in the additional sentences when the data is unchanged from the first sentence.
(Note that this practice can lead to the incorrect assembly of sentences if there is a high risk of loss of sentence.).

MWD – Wind direction and speed

The direction from which the wind blows across the earth's surface, with respect to north, and the speed of the wind.



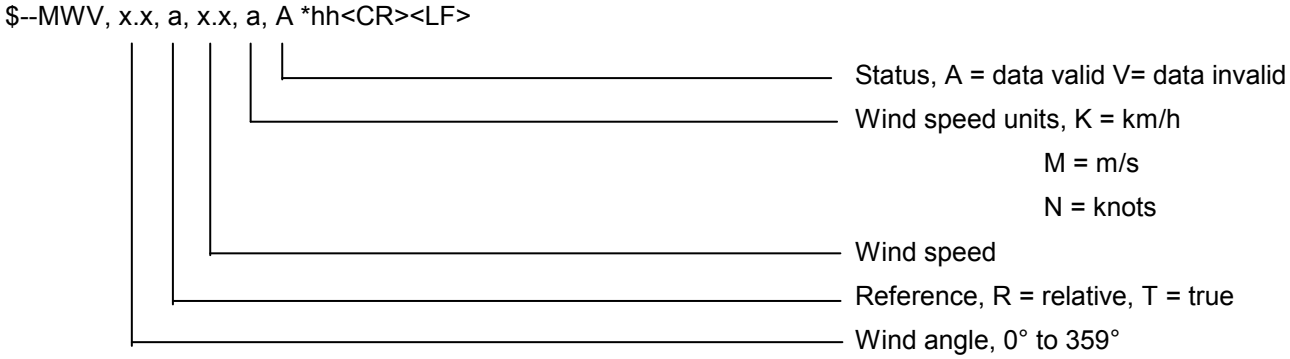
MWV – Wind speed and angle

When the reference field is set to R (Relative), data is provided giving the wind angle in relation to the vessel's bow/centreline and the wind speed, both relative to the (moving) vessel. Also called apparent wind, this is the wind speed as felt when standing on the (moving) ship.

When the reference field is set to T (Theoretical/calculated wind), data is provided giving the wind angle in relation to the vessel's bow/centreline and the wind speed as if the vessel was stationary. On a moving ship, these data can be calculated by combining the measured relative wind with the vessel's own speed.

Example 1 If the vessel is heading west at 7 knots and the wind is from the east at 10 knots the relative wind is 3 knots at 180°. In this same example the theoretical wind is 10 knots at 180° (if the boat suddenly stops the wind will be at the full 10 knots and come from the stern of the vessel 180° from the bow).

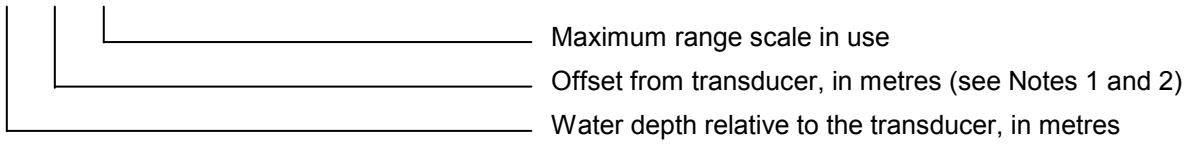
Example 2 If the vessel is heading west at 5 knots and the wind is from the southeast at 7,07 knots the relative wind is 5 knots at 270°. In this same example the theoretical wind is 7,07 knots at 225° (if the boat suddenly stops the wind will be at the full 7,07 knots and come from the port-quarter of the vessel 225° from the bow).



DPT – Depth

Water depth relative to the transducer and offset of the measuring transducer. Positive offset numbers provide the distance from the transducer to the waterline. Negative offset numbers provide the distance from the transducer to the part of the keel of interest.

$--DPT, x.x, x.x, x.x*hh<CR><LF>



NOTE 1

"positive" = distance from transducer to water line; "-" = distance from transducer to keel.

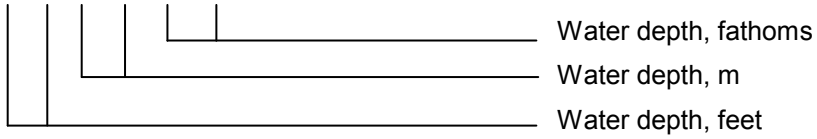
NOTE 2

For IEC applications, the offset should always be applied so as to provide depth relative to the keel.

DBT – Depth below transducer

Water depth referenced to the transducer.

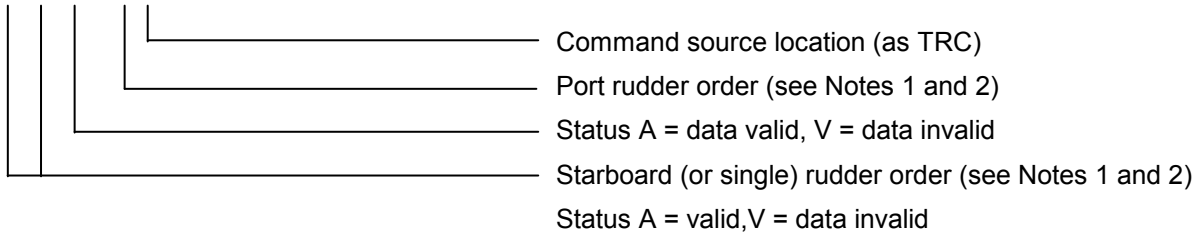
$--DBT, x.x, f, x.x, M, x.x, F*hh<CR><LF>



ROR – Rudder order status

Angle ordered for the rudder.

$--ROR,x.x,A,x.x,A,a*hh<CR><LF>



NOTE 1

Relative measurement of rudder order angle without units, "-" = bow turns to port.

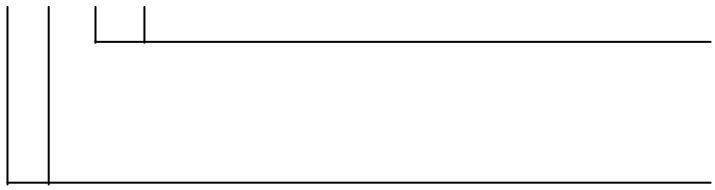
NOTE 2

The status field should not be a null field.

RSA – Rudder sensor angle

Relative rudder angle, from rudder angle sensor.

$--RSA, x.x, A, x.x, A*hh<CR><LF>



Port rudder sensor (see Notes 1 and 2)
Status A = data valid,
V = data invalid
Starboard (or single) rudder sensor (see Notes 1 and 2)
Status A = valid,
V = data invalid

NOTE 1

Relative measurement of rudder angle without units, "-" = bow turns to port. Sensor output is proportional to rudder angle but not necessarily 1:1.

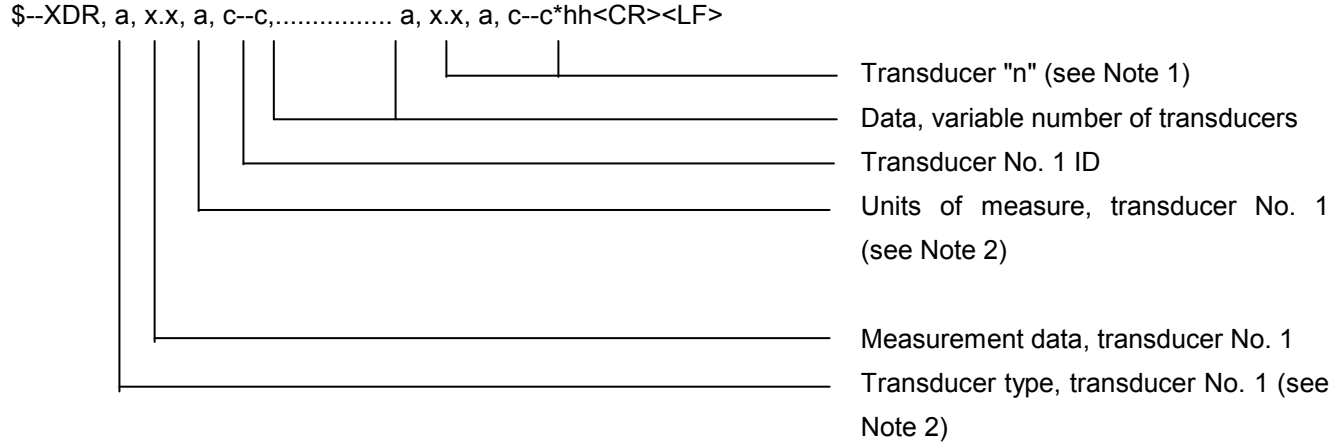
NOTE 2

The status field should not be a null field.

XDR – Transducer measurements

Measurement data from transducers that measure physical quantities such as temperature, force, pressure, frequency, angular or linear displacement, etc. Data from a variable number of transducers measuring the same or different quantities can be mixed in the same sentence.

This sentence is designed for use by integrated systems as well as transducers that may be connected in a "chain" where each transducer receives the sentence as an input and adds on its own data fields before retransmitting the sentence.



NOTE 1

Sets of the four fields "type-data-units-ID" are allowed for an undefined number of transducers. Up to "n"transducers may be included within the limits of allowed sentence length; null fields are not required except where portions of the "type-data-units-ID" combination are not available.

NOTE 2

Allowed transducer types and their units of measure are as specified in below table – see next page.

Transducer	Type field	Units	Comments
Temperature	C	C = degrees Celsius	
Angular displacement	A	D = degrees	"-" = anticlockwise
Absolute humidity	B	K = kg/m3	Kilograms per cubic metre
Linear displacement	D	M = metre	"-" = compression
Frequency	F	H = Hertz	
Salinity	L	S = ppt	ppt = parts per thousand
Force	N	N = newtons	"-" = compression
Pressure	P	P = pascals	"-" = vacuum
Flow rate	R	l = litres/s	
Tachometer	T	R = revolutions/min	
Humidity	H	P = per cent	
Volume	V	M = cubic metres	
Voltage	U	V = volts	
Current	I	A = amperes	
Switch or valve	S	None (null)	1 = ON, CLOSED; 0 = OFF, OPEN
Generic	G	None (null)	x.x = variable data

2.4 Serial Line 4

It is possible to receive RS422 or RS232 standard signal at 4800 bps indifferently on TB2 (422). Note that the circuit is able to receive at 4800 bps also with RS232 connection, but this is not a standard connection according to the IEC 61162-2 standard.

RS 422 Interface Listener Connection

+ IN_4	"A" Data Input
- IN_4	"B" Data Input
SHLD_4	“C” insulated Ground
Input Load	≥ 3 KΩ

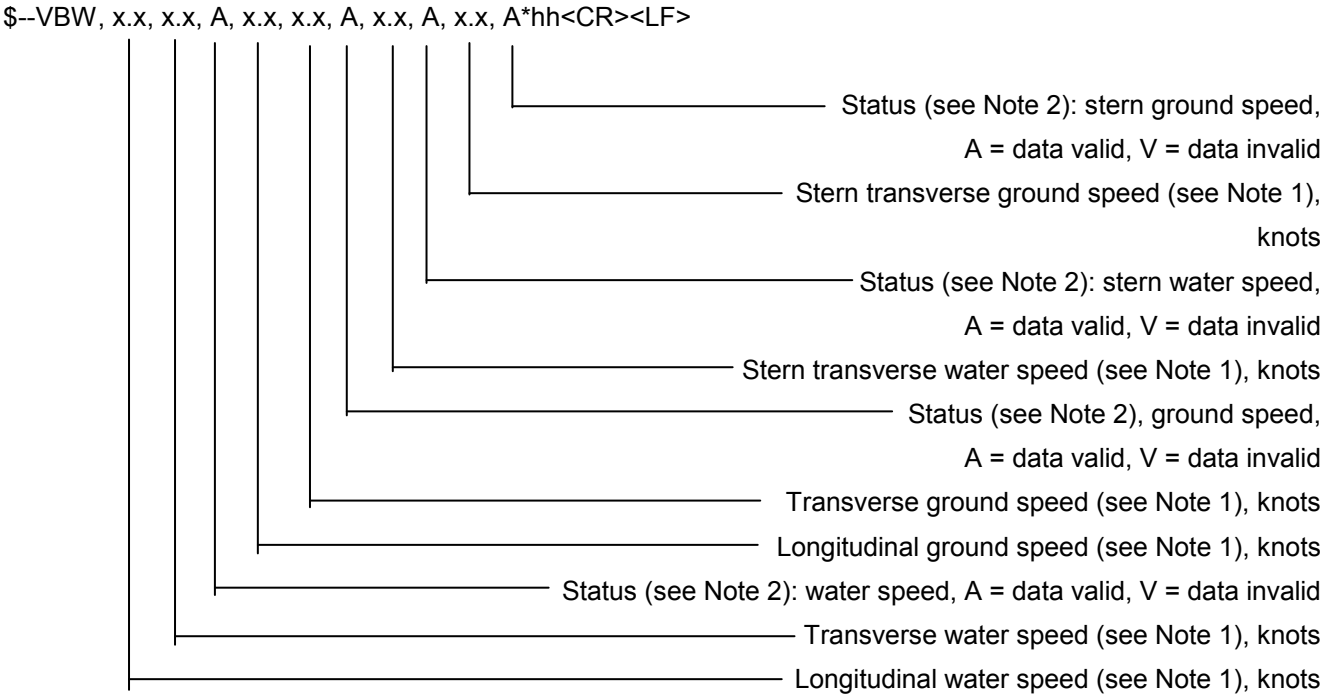
RS 232 Interface Listener Connection

- IN_4	RX Data Input
SHLD_4 and + IN_4	Insulated ground
Input Load	≥ 3 KΩ

This serial line complies to IEC 61162-1 and IEC 61162-2.
Accepted sentences: VBW and VHW.

VBW – Dual ground/water speed

Water-referenced and ground-referenced speed data.



NOTE 1

Transverse speed: "-" = port,

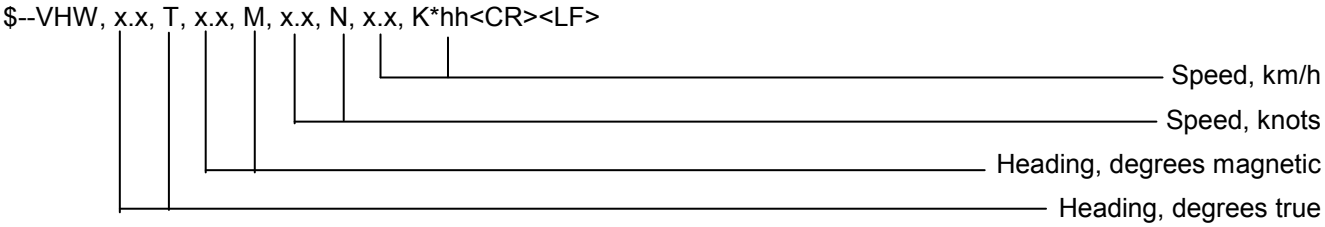
Longitudinal speed: "-" = astern.

NOTE 2

The status field should not be a null field.

VHW – Water speed and heading

The compass heading to which the vessel points and the speed of the vessel relative to the water.



2.5 Serial Line 5

It is possible to receive RS422 or RS232 standard signal at 2400 or 4800 bps indifferently on TB6 (232+422_2).

SCHEME 1
IN +
IN -
GND
422+
422-
232

RS422 Interface Listener Connection

+ IN	"A" Data Input
- IN	"B" Data Input
GND	“C” Ground
Input Load	≥ 3 KΩ

RS232 Interface Listener Connection

- IN	RX Data Input
GND and + IN	Ground
Input Load	≥ 3 KΩ

RS422 Output Talker Connection

+ OUT	"A" Data Output
- OUT	"B" Data Output
GND	“C” Ground
Output Drive	150 mA

RS 232 Output Talker Connection

TX	TX Data Output
GND	GND
Output Drive	10 mA

2.6 Serial Line 6

It is possible to receive RS422 or RS232 standard signal at 2400 or 4800 bps indifferently on TB12 (232+422_1).

RS 422 Interface Listener Connection

+ IN_6	"A" Data Input
- IN_6	"B" Data Input
GND	“C” Ground
Input Load	≥ 3 KΩ

RS 232 Interface Listener Connection

- IN_6	RX Data Input
GND and + IN_6	Ground
Input Load	≥ 3 KΩ

RS 422 Output Talker Connection

+ OUT_6	"A" Data Output
- OUT_6	"B" Data Output
GND	“C” Ground
Output Drive	150 mA

RS 232 Output Talker Connection

TX_6	TX Data Output
GND	GND
Output Drive	10 mA

2.7 Serial Line 7

It is possible to receive RS422 or RS232 standard signal at 4800 indifferently on TB10 (422). Note that the circuit is able to receive at 4800 bps also with RS232 connection, but this is not a standard connection according to the IEC 61162-2 standard.

RS 422 Interface Listener Connection

+ RX_7	"A" Data Input
- RX_7	"B" Data Input
GND	“C” Ground
Input Load	≥ 3 KΩ

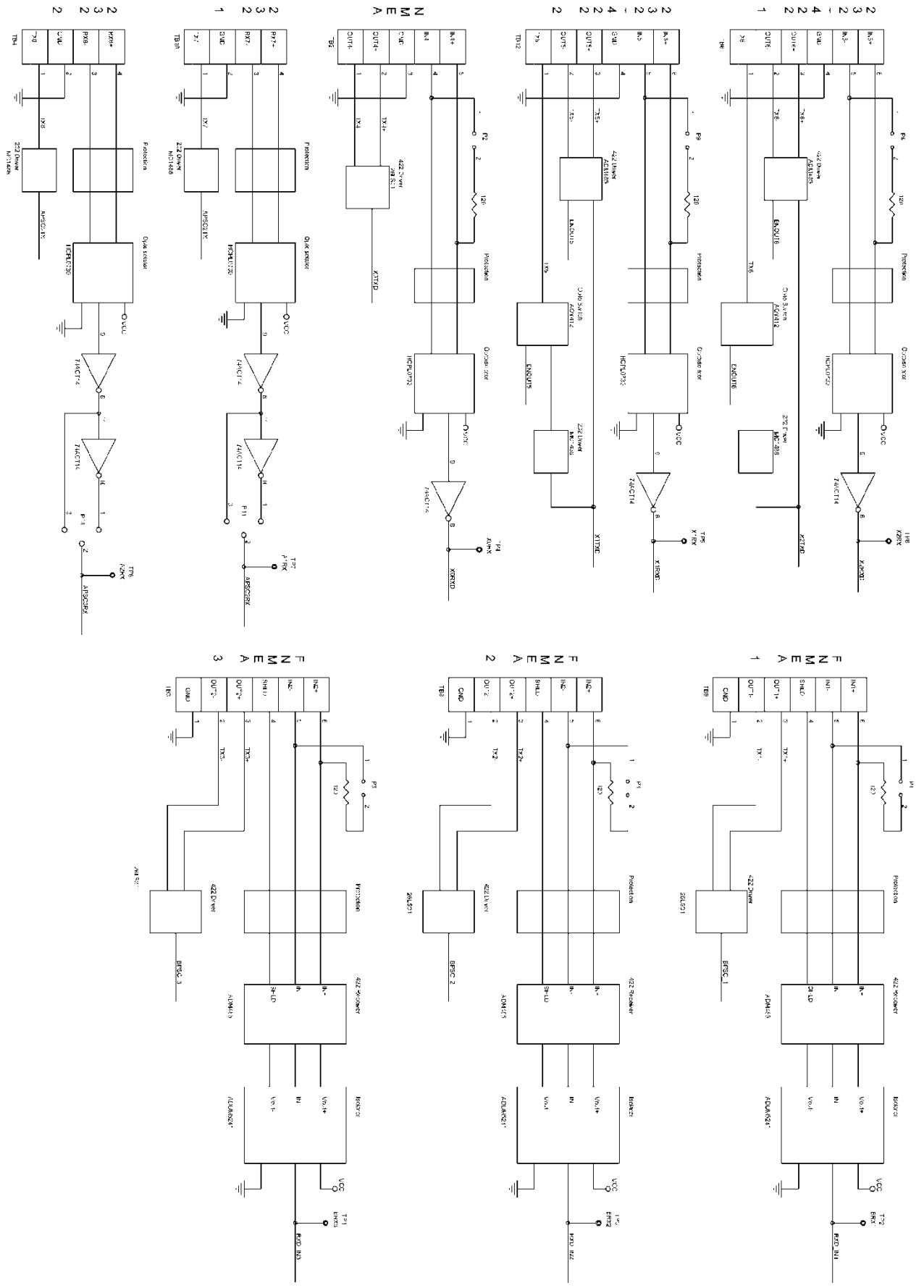
RS 232 Interface Listener Connection

- RX_7	RX Data Input
GND and + RX_7	Ground
Input Load	≥ 3 KΩ

RS 232 Output Talker Connection

TX_7	TX Data Output
GND	GND
Output Drive	10 mA

The output is the source of RAALR sentences.



Antares PCB Serial In / Out Port Summary

Processor	Device and Connector Name		Used For	Input Type	Output Type	Input / Output Baud Rate
A	ttyS0		Standard Out Console	232	232	57600
	ttyS1		Keyboard	232	232	38400
	ttyS2	TB10	Wind Sensor /RAALR	422/232	*232*	4800
	ttyS3	*TB4*	*Not Used*	*422/232*	*232*	*4800*
B	ttyS0		Standard Out Console	232	232	57600
	ttyS1	TB9	Gyro	422/232	422	4800 / 38400
	ttyS2	TB8	AIS In / AIS ACK and TTD-TLB Out	422/232	422	38400
	ttyS3	TB3	INS / EPFS / ECDIS	422/232	422	4800 / 38400
	ttyS4	TB2	Speed Log	422/232	422	4800
	ttyS5	TB6	Serial TXRX 1	422/232	422/232	4800
	ttyS6	TB12	Serial TXRX 2	422/232	422/232	4800

CHAPTER 3
RADAR CONFIGURATION

3.1 How to access the Radar Configuration

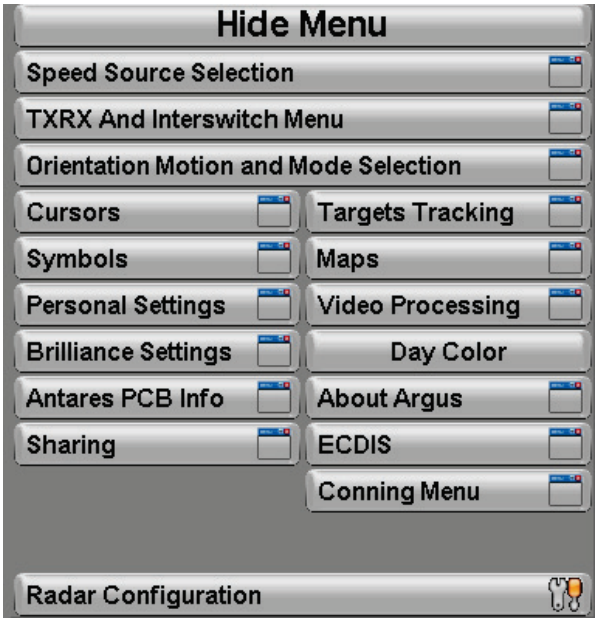
To access the Radar configuration a password is required. It will then be possible to make the necessary adjustments in the System Configuration, plus some Debug and Simulation facilities are available.

After enabling this function, it will be open for adjustment until the system is switched to STAND BY.

3.1.1 Radar Configuration

To obtain access to the Radar Configuration MENU, please follow the procedure below. It will take you into the *Super User Mode* of the Argus system. Remember to save all settings and exit the mode again as soon as configurations are completed!

1) Press “Radar Configuration” in the Main Menu bar on the display:



2) Enter the password **"HIGH"** using the alphanumerical keypad:

3) Before entering the setup, a check dialog appear on screen with the following warning:

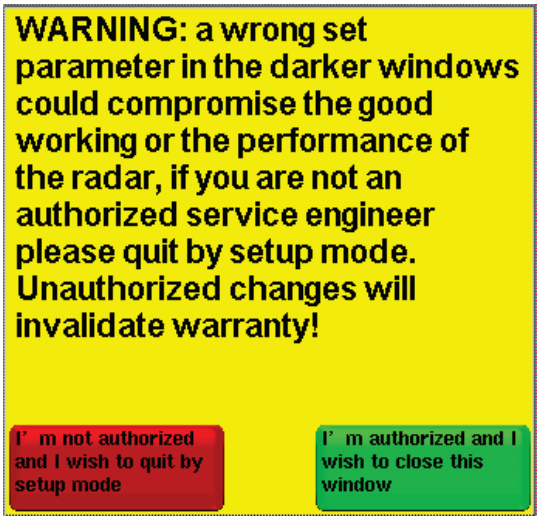


Fig 3.1.1 Security Check

The console setup is necessary for the commissioning of the system. From the console display, using only the trackball, it's possible to configure and adjust all parts of the system. Several functions of the console setup can normally only be accessed by an authorized service engineer using a password to gain access. Please contat Navico service if you need assistance.

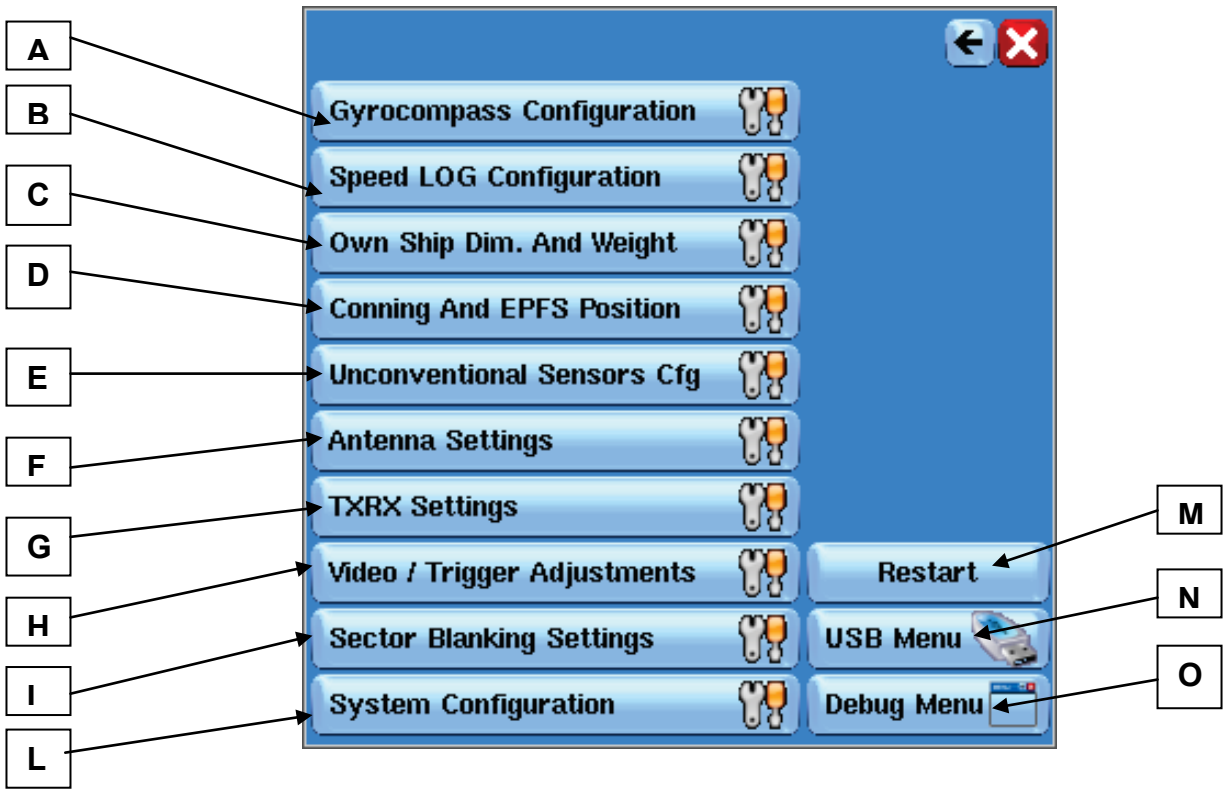


Fig 3.1.2 Radar configuration Menu

3.2 Gyrocompass Configuration

To configure the Argus radar settings for connected gyro:

Press the "**A**" button in fig. 3.1.2, page 3.2, to open the following window:

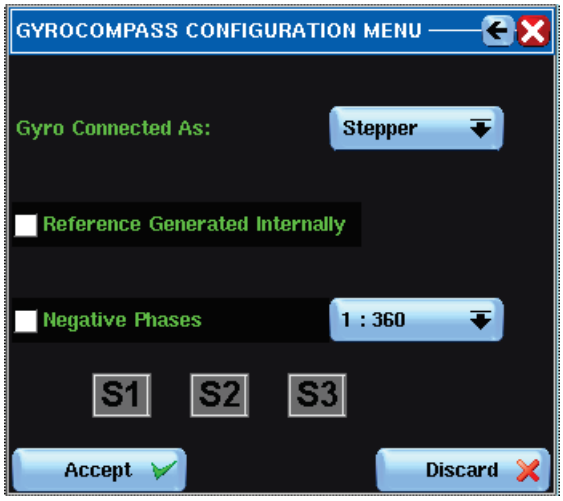
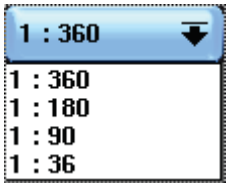


Figure 3.2.1 Gyro compass Configuration Menu

The first row, “Gyro Connected As” indicates the type of Gyro. By pressing the associated button will open the following list:

The selection changes the type of interface used, and for NMEA (referring to NMEA 0183) serial, the baud rate**.**

By pressing the “Negative Phases” associated button, another list will open, showing the possibilities of Gyro ratio.



The list is valid and activated only when the Gyro is not serial.

Use the list to define how many cycles of stepper or synchro are calculated for each 360° Gyro turn.

Examples:

1:360 means that each stepper or synchro cycle corresponds to 1 degree and 1 complete 360° turn correspond to 360 cycles. For this setup the gyro resolution will be 1/6°

1:36 means that each stepper or synchro cycle corresponds to 10 degree, and 1 complete

360° turn correspond to 36 cycles.

Normally, for most Gyro types, the Gyro Ratio is 1:360.

Other settings are available with analogue gyro, one is the "**Reference generated Internally**" checkbox that is the usual setup for stepper gyro.

When the reference signal to sample phases is external, the checkbox should not be activated.

Another checkbox "**Negative Phases**" is available in stepper mode, and it should be checked, when the voltage on phase is going from zero to negative.

The S1, S2, S3 symbols can be highlighted and reflect exactly the same gyro phases states described in the analogue gyro section.

The user manual explains the analogue gyro interface operation.

Note that this kind of interface does not permit equal phase levels, or lack of reference signal (synchro mode). Failure warnings due to incorrect settings can only be cleared by correcting the gyro settings.

The gyro preset is necessary also because this kind of interface is not absolute, but receives incremental pulses and therefore needs a preset value taken when the ship's heading is stable.

3.3 Speed LOG Configuration

In this menu it is possible to configure the connection of a Speed LOG to the radar, by pressing the "**B**" button on fig. 3.1.2, page 3.2, the following window will be displayed:

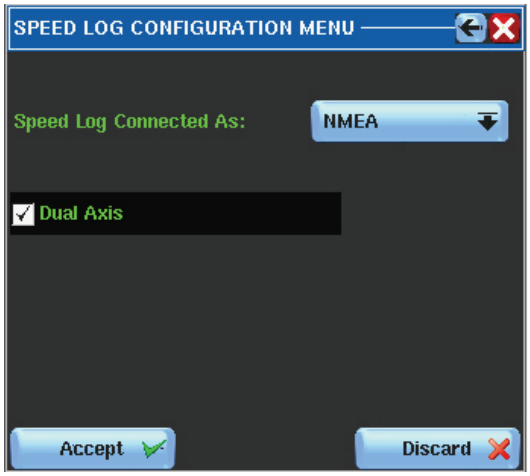
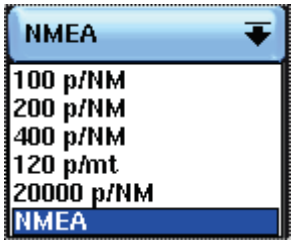


Figure 3.3.1 Speed Log Configuration

The first row indicates the type of Speed Log connected. By pressing the asociated button, the following list will open:



If the speed log signal is NMEA (referring to NMEA 0183), it is necessary to select the Input where it is connected, push the **B** button on fig. 3.1.2, page 3.2, to switch between the possibilities.

Type	**Function**
100 p/NM	PIT dry contact, 100 pulses per NM
200 p/NM	PIT dry contact, 200 pulses per NM
400 p/NM	PIT dry contact, 400 pulses per NM
120 p/mt	FOR signal input, 120 pulses per meter
20000 p/NM	FOR signal input , 20000 pulses per NM
NMEA	RS232/422 NMEA 0183 serial connection

3.4 Own Ship Dim. and Weight

By pressing the “Own Ship Dim. and Weight " button, the following window will appear:

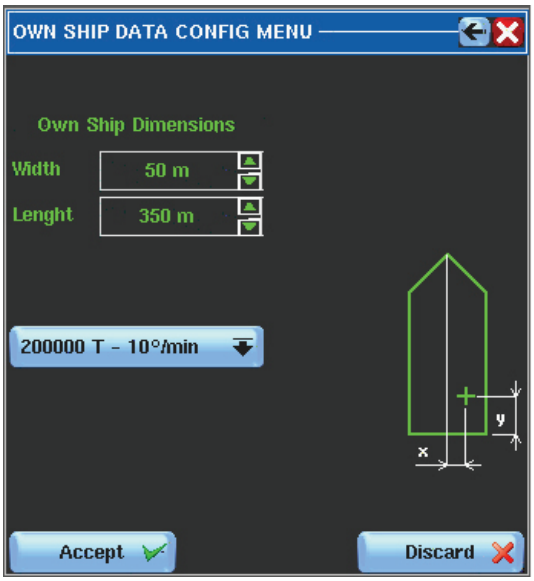
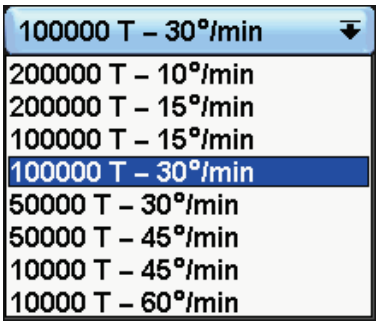


Figure 3.4.1 Own Ship Dim. and Weight

In the window, it is possible to insert the following data:

- **Weight:** by pressing the relevant button will open a list:



The list shows a selection of 8 pre-defined **Tonnage** / **ROT** values. The chosen selection related to the tonnage of the ship will be used to define the Rate of Turn for the Trial Manoeuvre computing.

Be sure to select a relevant value, otherwise the Trial Manoeuvre will provide incorrect information;

Length: look to the help line for correct use of the 3 Mouse Operating Push Buttons in order to decrease, increase the length value or input a new length value in meters.

Width: look to the help line for correct use of the 3 Mouse Operating Push Buttons in order to decrease, increase the width value or input a new width value in meters.

3.5 Conning and EPFS Pos. Configuration Menu

By pressing the “Conning and EPFS Position” button, the following window will appear:

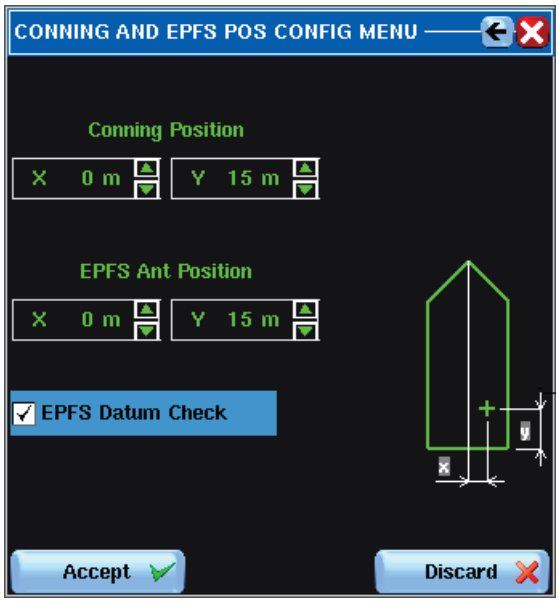


Figure 3.5.1 Conning and EPFS Position

Conning Position: Look to the help line for correct use of the 3 Mouse Operating Push Buttons in order to decrease, increase the X or Y value or input a new X or Y value in meters. A picture of the ship profile and a text on line will be drawn in order to help the operator to insert the correct values. This is the position of the EPFS referred to the graphical shape as indicated in the figure. This value is used to calculate the exact geographical coordinate of the antenna position. Length and width are not used when AIS is connected, instead they are extracted from the VDO static message. The CCRP will be located at the conning position.

EPFS Ant. Position: Look to the help line for correct use of the 3 Mouse Operating Push Buttons in order to decrease, increase the X or Y value or input a new X or Y value in meters. A picture of the ship profile and a text on line will be drawn in order to help the operator to insert the correct values. This is the position of the EPFS referred to the graphical shape as indicated in the figure. This value is used to calculate the exact geographical coordinate of the GPS antenna position.

EPFS Datum Check: Accept the DTM sentence when the checkbox is signed. The datum is used to compensate local geographic coordinates with an offset with reference to WGS-84.

3.6 Unconventional sensor Cfg.

By pressing the “Unconventional sensor Cfg” button, the following window will appear:

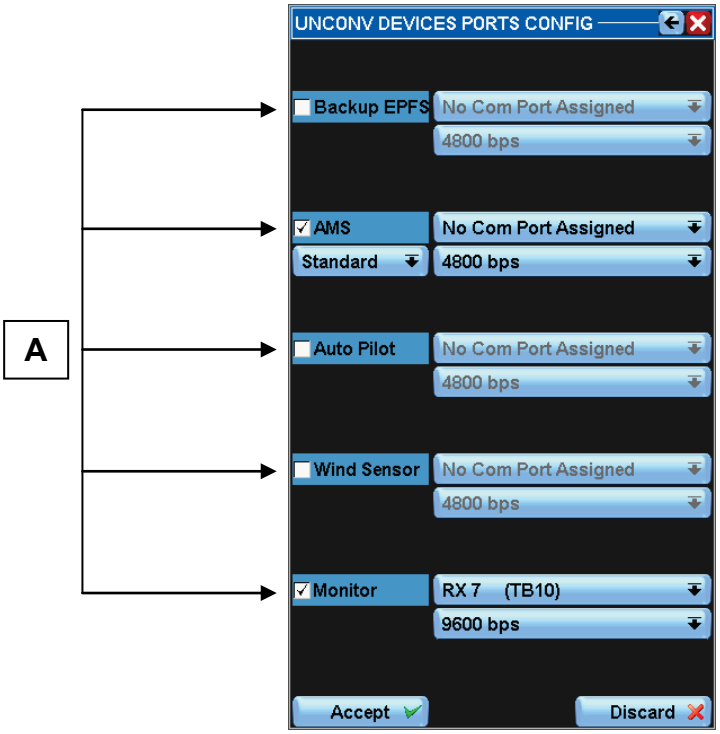


Figure 3.6.1 Unconventional sensor Cfg.

With this function, it is possible to configure specific sensors (A) in addition to the conventional sensors. For example, a GPS backup is useful when connected to ECDIS, a wind sensor for conning wind information, an alarm monitoring system.

The menu above, as well as identifying the selected sensor, has the characteristic of being able to set the serial port speed.

NOTE
This operation is possible only and exclusively if the various sensors are directly connected to the RADAR.

3.7 Antenna Settings

By pressing the “Antenna Settings " button, the following window will appear:

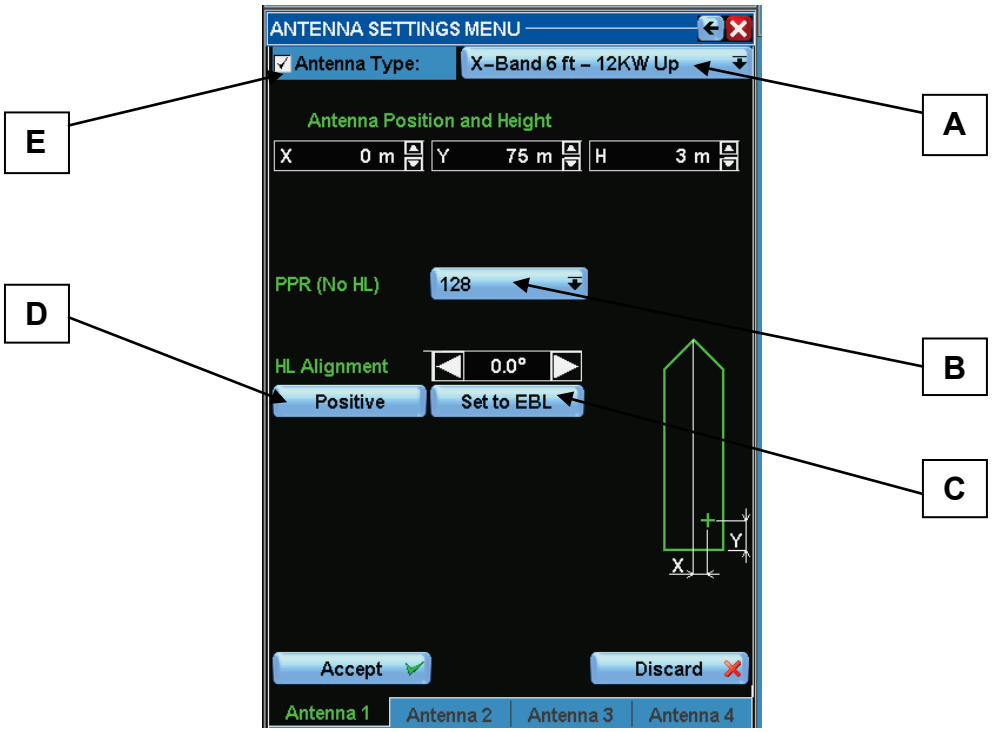
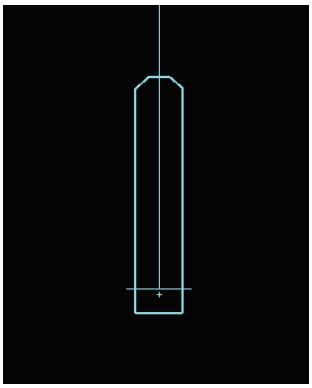


Figure 3.7.1 Antenna Settings

Following the Help Line and the suggestion in the window, it should be easy to set the correct values for antenna height and antenna Cartesian coordinates, which will be important to draw the ship profile correctly, visible only at a low range scale.

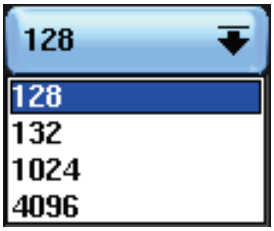
The PPI will be centred on the cross representing the position of the Radar. The antenna height is one of the parameters used to calculate the Anti Sea Clutter processing.
As a consequence of this insertion, a drawing of the ship's profile will appear at a low scale in the centre of the PPI:



To configure a valid radar connection, the checkbox E should be activated and the correct antenna selected from list A .
The PPR selection B is available only when communication with the transceiver is in parallel mode (all radar signals connected separately).

3.7.1 Adjustment of Azimuth Type (PPR Selection)

Pressing the **B** button of fig. 3.7.1, page 3.9, a list will be open with all the possible azimuth values.



The list below shows all the standard and some special configurations with the relevant PPR:

Antenna Pedestal	Sensor Type	PPR
1XP	Proximity Switch	132
1XP	Encoder Kit	1024 to 4096
SU	Lettore + Antsig	128
SU	Encoder Kit	1024 to 4096
SRT 12/25 UP	Lettore + Antsig	128

NOTE

If the communication with the transceiver has already been established, if the Heading Line pulse is being received and if it has been correctly set, it is possible to read the PPR value measured by he system, on the label next to the PPR selection (between parenthesis). This is the easier and faster way to insert the correct PPR setting.

3.7.2 Adjustment of the heading line

Pressing the **C** button of fig. 3.7.1. page 3.9, it is possible to set the Heading Line:
The Heading Line skew value can be set in two ways:

- Pressing the right or left arrow in order to turn the Radar picture clockwise or counter clockwise with a precision of 1/10 of a degree, with the possibility to turn it from -180° to +180°

- Placing the EBL on the angle where it is desired to place the HL and pressing the **"SET TO EBL"** button, the picture will automatically turn, placing the angle where the EBL was positioned on the Heading Line Marker.

Press the **D** button to select the correct Heading Line polarity, positive for a signal that is zero with positive voltage as the active state, negative when the signal is bipolar (going from negative to positive voltage) or active with a negative level.
Note: This function is only available when Alpha Extension board is installed.

WARNING

BUTTONS **B** AND **D** ARE AVAILABLE ONLY FOR THE RADAR VIDEO CHANNEL 1 AND 2.

CAUTION

IF THE CORRECT ANTENNA AND ANTENNA HEIGHT HAS NOT BEEN SELECTED OR IF THE SEA TABLES WERE NOT CREATED, A DEFAULT SETTING WILL BE USED. THE DEFAULT SETTING MAY, HOWEVER, NOT BE THE OPTIMAL ONE FOR TARGET DETECTION IN THE SEA CLUTTER AND TRACKING PERFORMANCE.

3.8 TXRX Settings

Pressing the button TXRX settings (**G** button of fig. 3.1.2, page 3.2), the window below will appear. The TXRX buttons can be up to four, to which can be connected the 3rd and the 4th TXRXs. In the "TXRX n SETUP MENU" (where n is the number of the TXRX chosen) it is possible to adjust the TXRX parameters such as video, heading line, azimuth type, etc.

Note: Some of these functions are protected by a password i.e. can only be accessed by authorized personnel.

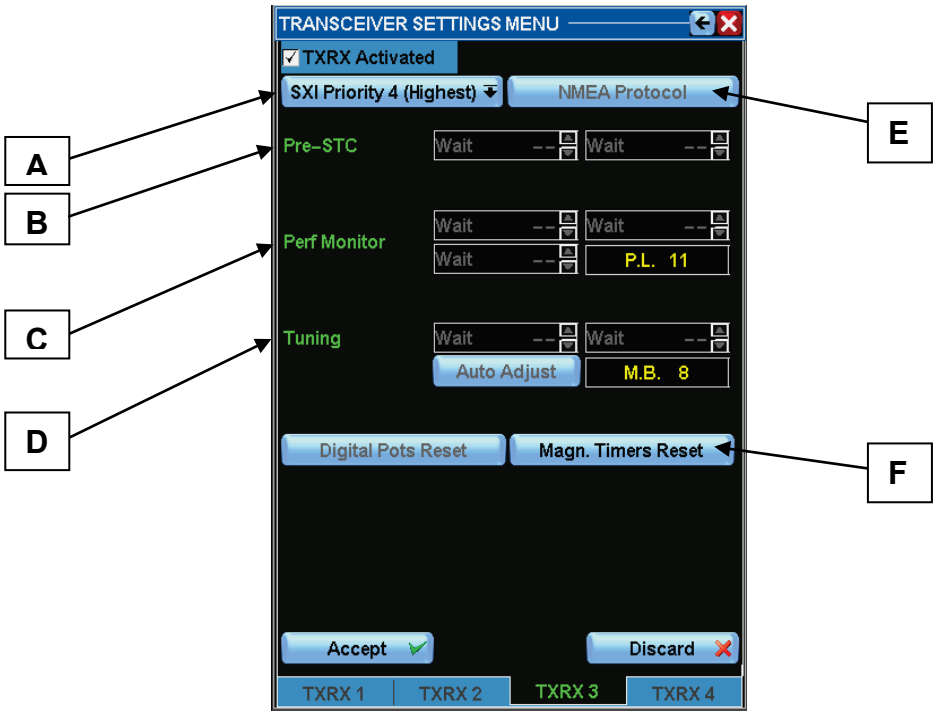


Figure 3.8.1 TXRX Settings Menu

NOTE

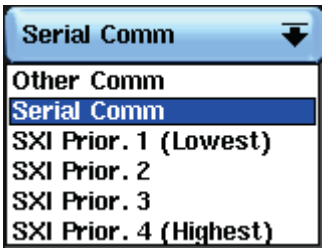
In case of connection with a MOSFET transceiver with an "RTM Control P.C.B." on board instead of an "RTM Control B P.C.B." (TXRX software version lower than 54), the buttons in position 12-15-16-17-19 will not be activated. In case of connection with a non Simrad transceiver or with an old transceiver type (non MOSFET), all the buttons above and the button in position 5 will not be activated.

The password protected NMEA Protocol button (E) selects the protocol to use. All SRT and SRT derived transceivers work with NMEA protocol.

The communication mode is working at a baud rate of 4800 bps. More TXRX information is available from the Debug Display window (see Chapter 4), selecting the TXRX communication messages.

3.8.1 Transceiver Communication Type

Pressing the **A** button of fig. 3.8.1, page 3.12, the following list will open:



The list permits the selection of the communication's type used to control the transceiver.

Other Comm: For any transceiver that cannot be controlled by the console, but is still able to generate the appropriate video, trigger and antenna synchronism signal.

Serial Comm: For the standard connection with RS232 serial line.

SXI n Comm: For video combined connections, all the signals needed are combined with the video on only one coaxial cable; "**n**" is the console priority for that transceiver.

Higher numbers have higher master priority than lower ones.

CAUTION

PRIORITY NUMBERS ARE IMPORTANT AND SHOULD NOT BE MIXED UP. IF THE SETUP HAS TO BE TRANSFERRED FROM CONSOLE TO CONSOLE VIA A MEMORY STICK, CHECK THAT PRIORITY IS NOT THE SAME IN ANY OF THE CONSOLES CONNECTED TO THE SAME RADAR INPUT. TWO CONSOLES WITH SAME PRIORITY, TRYING TO BE MASTER OF THE SAME TRANSCEIVER WILL SEND CONFLICTING COMMANDS AND MAKE IT JUMP BY DIFFERENT PRFS OR TUNING SETTINGS.

3.8.2 Transceiver Communication Type

Pressing the **B** button of fig. 3.8.1, page 3.12, (password protected), it is possible to adjust amplitude and slope of the TXRX Pre-STC. The range scale is automatically set to 0.75 NM. Amplitude and slope can be adjusted using the up and down arrow. This adjustment optimises the minimum visible distance and it can affect the auto-tuning performance for TXRX not derived from SRT.

Connecting the probe of the oscilloscope to the pin STC of TB13 of the RTM Control B PCB (the connector of the I.F. Amplifier, normally the blue wire), the PRESTC ramp will be shown on the scope.

The Amplitude shall be adjusted to be about 4 - 4.2V.

The Slope shall be adjusted to be about 2 - 3 µs.

The PRESTC is not a video processing to be used continuously during the normal operating, but it is a fixed STC curve stored in the TXRX to suppress enough main bang and too close echoes that otherwise would be in saturation. This adjustment is normally perfectly performed at the testing in the factory, and shall not be touched again, and only very skilled radar experts shall be allowed to touch these adjustments in case of very special situations.

The digital potentiometer values to measure the above described Amplitude and Slope values are normally:
- Amplitude 58 - 60
- Slope 5 – 9

CAUTION
BAD ADJUSTMENT OF PRESTC WILL COMPROMISE ARPA GOOD WORKING AND / OR AUTO TUNING FACILITY.

3.8.3 Performance Monitor Adjustment

Press the **C** button of fig. 3.8.1, page 3.12, to control the performance monitor. The range scale is automatically set to 24 NM and the performance monitor activated. Set the transceiver at maximum tuning using the Auto Tuning function or by adjusting the Manual Tune Progress bar to have the best echoes performance on the screen.

The top arrow buttons can be used to adjust the opening of the Performance Monitor Ring (now visible on the screen) and the bottom ones can be used to adjust the distance of the above mentioned ring.

Referring to the above figure "OPEN" and "DISTANCE" labels indicate the actual values of the digital potentiometers.

The Opening shall be adjusted to around 60 to 100 degrees.

The Distance (which correspond to the Power Level) shall be adjusted to a value of around 180 in the label down on the left (P.L.).

NOTE
the performance monitor is a facility used to check the performance of the transceiver, so it is very important that it is made one time at the installation. If, for example, the Power Level is low and the distance is less than 24 NM, it could indicate that the Performance Monitor is not correctly adjusted, but the reason could also be that the performance of the TXRX is low and the magnetron could be old or defective.

3.8.4 Tuning Adjustment

Pressing the **D** button of fig. 3.8.1. page 3.12, it is possible to adjust the Tuning. The range scale is automatically set to 24 NM, the performance monitor activated, the tuning control set to the middle position. The right placed label with "M.B." written indicates the Main Bang value and the procedure for the adjustment is described in detail in the transceiver technical manual.

There are 2 possibilities to adjust the tuning on Argus displays: Automatic or Manual. Press "Auto Adjust" to run the procedure automatically. The M.B. label content will change indicating the following possible steps of the adjusting:

- **Init Off** Decreases the Tune Offset potentiometer down to 0;
- **Scan n** Increases the potentiometer until it reaches the maximum (99);
- **Set Off** Decreases again the potentiometer to the optimal Tune Offset found in the previous step;
- **Adjust n** Decreases the tune indication potentiometer down to 0 and increases it until the main bang value (n) reaches 128;
- **M.B. n** Display the actual main band value.

3.8.5 Magnetron timer reset

When the magnetron is replaced and only when it is replaced, the Service Engineer should reset the timers of the transceiver so that at the next service it will be possible to check how many hours the new magnetron has been transmitting, and at which pulse and PRF, and thereby see if it is really still new or needs to be changed.

The magnetron timers can be reset by pressing the **"F"** button of fig. 3.8.1, page 3.12, and accepting the action, pressing **"Yes"** to the asked question "Are You Sure?".

The Argus system gives a System Warning if the magnetron is close to the expected lifetime. A "Magnetron EOL" (End Of Life) will be displayed under the TXRX field in the System Status Display Menu.

Everything described in this paragraph is valid only in case of RTM Control B PCB on board of the transceiver (TXRX software version 54 or higher). If this is not the case, when the magnetron is replaced, it is kindly requested to write down the value of the Main TX timer (which is placed on the Transformer assy of the transceiver) on a sticker and attach it on the chassis of the transceiver.

3.8.6 Digital potentiometers reset

This button (password protected) should be used when it is necessary to restore the default presets of the transceiver when the service engineer is no longer able to return it to a working condition.

3.9 Video Trigger Adjustments

Pressing the **H** button (password protected) of fig. 3.1.2**,** page 3.2, it is possible to adjust the radar video and trigger delay.

IMPORTANT

TO GAIN ACCESS TO THIS FUNCTION THE SYSTEM MUST BE MASTER (refer to the Argus Radar System user manual 988-10185-003). THIS TYPE OF ADJUSTMENT MUST BE CARRIED OUT IN PORT.

After entering the section “VIDEO AND TRIGGER SETTINGS” the following screen display appears on the left side of the menu.

IMPORTANT

AFTER ENTERING THE SECTION “VIDEO AND TRIGGER SETTINGS” THE SCALE AT 0.25 NM (operation useful only for setting the trigger delay) IS AUTOMATICALLY SET ON THE MAIN PPI DISPLAY.

This menu is divided into the following areas:

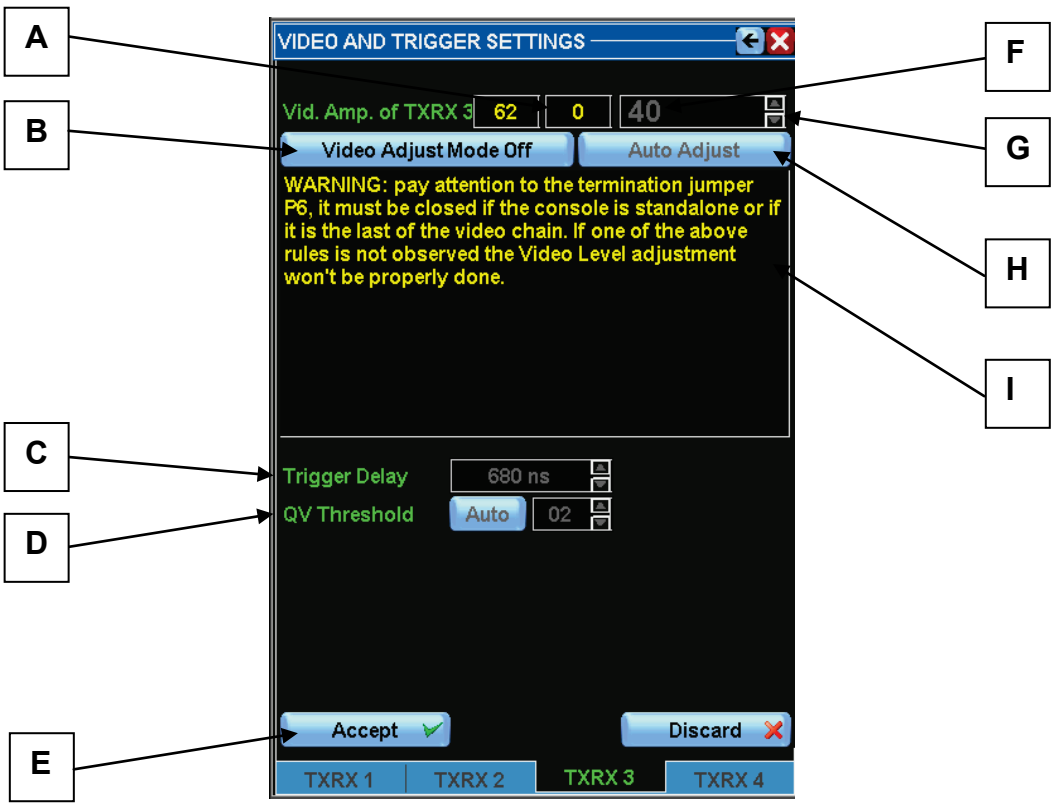


Figure 3.9.1 Video and Trigger Setting

3.9.1 Video Adjust Mode

Pressing the **B** button (password protected) of fig. 3.9.1, page 3.16, the system goes into "VIDEO ADJUST MODE ON" (under normal conditions this function is set to OFF). When carrying out this operation the TEST video is activated on the main PPI display; in other words, a large ring is created and the following actions are automatically carried out:

- A long impulse is emitted.
- The gain is forced by 100%.
- The video palette is changed in order to highlight the saturated echoes with a red colour (everything that is not saturated assumes a yellow colour).

To adjust the video the scale must be set at 0.75 NM or 1.5 NM (refer to the Argus user manual 988-10185-003, paragraph "Range scale increase/decrease"). Using the arrows **G** (Fig. 3.9.1, page 3.16) increase or decrease the value that appears in window **F** (Fig. 3.9.1, page 3.16).

The purpose of this operation is to eliminate the saturated echoes and therefore make the various red zones disappear from the video screen.

- If red zones are seen on the screen, decrease the value in window **F** (Fig. 3.9.1, page 3.16) to make them completely disappear (some limited red zones are acceptable).
- If the screen is completely yellow, increase the value in window **F** (Fig. 3.9.1, page 3.16) to make the red zones appear and then decrease the value to remove as many red zones as possible.

A datum that assists in understanding that the adjustment is correct is the value in window **A** (Fig. 3.9.1, page 3.16). This value oscillates during adjustment and it can assume three colourations:

- Yellow: when the value drops below 240 indicates that the value should be increased, but more than 220 is anyway acceptable.
- Red: when the value exceeds 250 indicates that the value must be decreased.
- Green: when the value is between 240 and 250 indicates that the value is correct.

End the adjustment operation by pressing push button **B** (Fig. 3.9.1, page 3.16) into OFF mode. Push button **H** (Fig. 3.9.1, page 3.16) permits the automatic adjustment of the video.

IMPORTANT

ALWAYS PRESS THE PUSH BUTTON **E** "ACCEPT" TO SAVE AND MAKE EFFECTIVE THE MODIFICATIONS CARRIED OUT.

3.9.2 Adopted communication configurations

A text appears in box **I** (Fig. 3.9.1, page 3.16). This text varies on the basis of the communication hardware configurations adopted between the console and the transmitter. Pay attention to what is shown, otherwise the adjustment operations could become useless and bring about an incorrect visualisation of the radar video.

3.9.3 Trigger Delay

Press the **C** button (password protected) of fig. 3.9.1, page 3.16 to adjust the Trigger Delay. The Trigger delay is caused by the path length mismatch for the trigger and video signal.

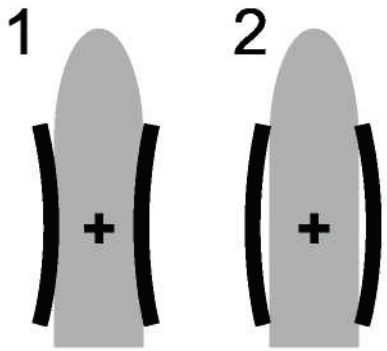
The video path delay is much longer because it's the result of the transmission through the waveguide to the antenna and back.

The delay depends of the length and type of the cable/waveguide used in the installation.

The range scale is automatically set to 0.25 NM. Press the arrow buttons in order to enlarge or squeeze the picture and adjust the delay between video and trigger from 0 meters to a maximum of 384 meters.

The delay adjustment is visible in real time on the PPI around the ship.

The illustration shows two different samples of incorrectly adjusted trigger delay:



- 1: The dock or pier is bowed towards the center, which means that the figure is too high
- 2: The dock or pier is bowed away from the center, which means that the figure is too low.

NOTE

For SRT transceivers it is also possible to change the delay to negative numbers. In this case the trigger from the TXRX will be anticipated in time in respect to the video. This negative setting is needed when trigger and video are passing through long coaxial cables with different propagation times, the video cable being the slowest one.
This usually happens for all installations with an SRT Adapter Box, as buffer amplifier and cable lengths are more than 150 meters.

NOTE

On channel 1 and 2, two optional buttons C for Trigger and Video polarity will be available.

3.9.4 QV (Quantized Video) Threshold

WARNING

THIS VALUE MUST BE SET AT “AUTO” EXCEPT FOR THE VARIOUS CASES OUTLINED BY THE MANUFACTURER.

Pressing the **D** button (password protected) of fig. 3.9.1, page 3.16, it is possible to set the QV. The threshold is used by the automatic tracking to identify real radar echoes from receiver noise. This value depends on the receiver noise from the transceiver band and the video cable attenuation. This value can be set manually adjusting the noise level to see some speckles in the 24 NM range scale.

This adjustment is really subjective, and the receiver gain changes with the selected pulse length, with the weather, the humidity and so on, so the preferred solution is to activate the Auto Threshold. With this selection the automatic tracking software measures the PFA (Probability of False Alarm) and calculates the correct threshold for the optimum detection performance.

3.10 Sector Blanking

Pressing the **I** button of fig. 3.1.2, page 3.2, the following window will appear:

Figure 3.10.1 Sector Blanking Settings

The radar offers two blanking sectors, which can be set individually. Transmission will be off within the set sectors.

The sector blanking is visible on the PPI with a sector delimited by two green lines (which will be red during the setting) and, if the gain value is high enough, the absence of receiver noise will be clearly visible.

To configure sector blanking, use up or down arrows to change the **"Start Sector"** and the **"End Sector"** values. The graphic displayed on the PPI will change in real time, but the command to the transceiver will be sent only after pressing the **"Apply Sector"** button. Use **"Discard"** to discard temporary modifications to the sector blanking configuration. The **"on-off button next to the sector n label 1-2"** shall be pressed to cancel the current sector blanking.

NOTE

The settings of the Sector Blanking are stored directly in the TXRX and not in the Argus Core Unit/display.

3.11 System Configuration

Press the **L** button of fig. 3.1.2, page 3.2, and the following window will appear:

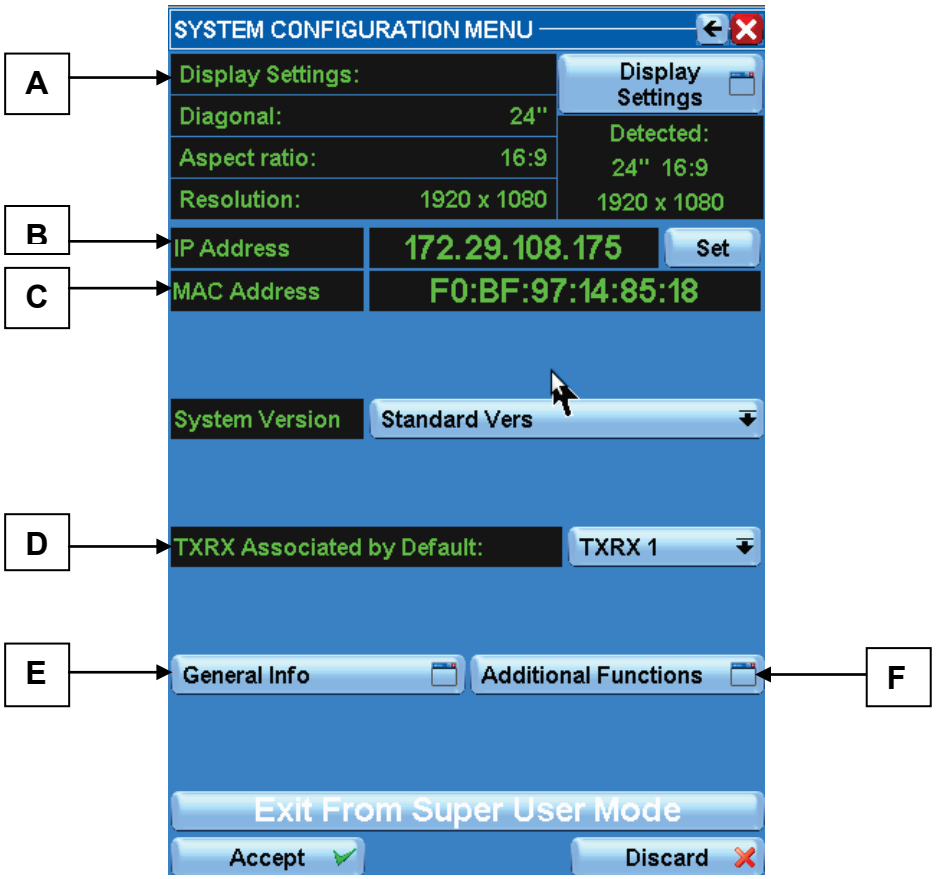
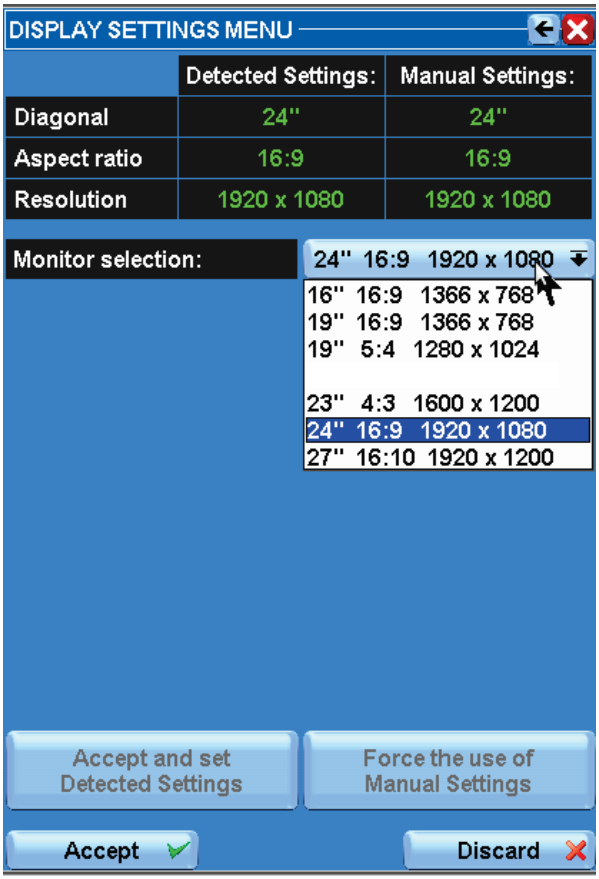


Figure 3.11.1 System Configuration

3.11.1 Display settings (Fig 3.11.1 -A)

The "Display settings" are the currently used settings. If the diagonal, the aspect ratio and the resolution information are shown in green, it means that the settings used are the same as detected directly by the monitor. Otherwise they will appear in red.

To modify the display settings, press the "Display Settings" button to enter the Display Settings menu – see example next page.



Current settings and detected settings are shown in this menu. You can choose to accept the detected settings by clicking on the "Accept and set Detected Settings" button, or you can manually change the display settings by selecting one of the “monitor selections” available.

The Argus display video output (DVI and VGA) can support 6 different display resolutions:

Display Resolution
1280x1024
1366x768
1600x1200
1920x1080
1920x1200

The table below shows which resolution is required for the different type monitors normally connected to an Argus display:

Unit Type	Description	Aspect Ratio	Display Resolution
M5016	16” Simrad	16:9	1366x768
M5019	19” Simrad	16:9	1366x768
10CM-003	19" TFT Hatteland	5:4	1280x1024
10CM-004	19" TFT ISIC	5:4	1280x1024
10CM-005	23" TFT Hatteland	4:3	1600x1200
10CM-006	23" TFT ISIC	4:3	1600x1200
M5024	24” Simrad	16:9	1920x1080
10CM-008	26/27" TFT Hatteland	16:10	1920x1200

To force the use of manual settings, click on the relative button “Force the use of Manual Settings”, then confirm by clicking on “Yes” followed by “Accept”.

WARNING

Settings which are not automatically recognized are most probably not IMO approved configurations. A warning: "NOT“APPROVED MODE” will appear in the System status window.

3.11.2 IP Address (Fig 3.11.1 -B)

The IP Addresses next to the “This Console” label are for the working console. The “PROC A IP” column is the IP address of Processor A of Antares p.c.b.

The Proc A IP of This Console can be set by clicking on the IP address field.

The Proc B IP will automatically be set.

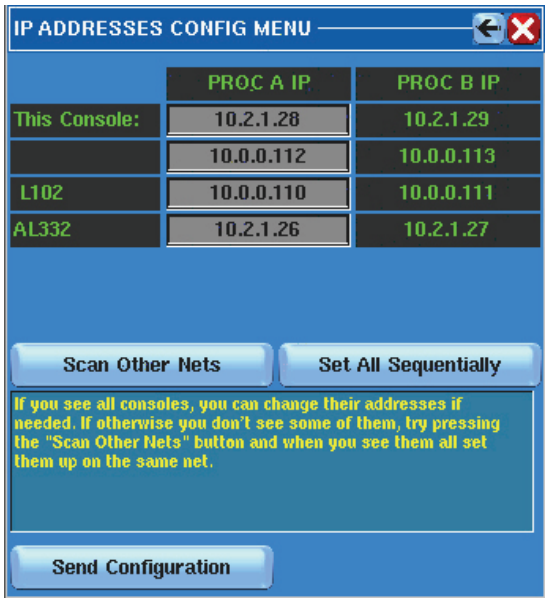


Figure 3.11.1-B

The following functions can be used only if This Console is connected via LAN with other Argus consoles:

Scan Other Nets
The Argus console searches through 10.x.x.x, 192.168.0.x, 172.1.x.x and 212.4.5.x subnetworks for other Argus units.
All the consoles available will be presented in the table.

Set All Sequentially
After a scan identification, the IP of the listed consoles in the table can be set in an incremental order starting from own console IP number.
The assigned IP will be incremented +2 for every console found and a dialog window will be shown on each one to accept the IP setting request.

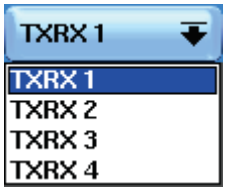
Send Configuration
This function can be used to share the configuration of This Console with the other ones. Please note that Transceiver, Antenna and Video/Trigger settings may have to be re-configured at each console.

3.11.3 MAC Address (Fig 3.11.1 -C)

This is the Ethernet MAC address of the board (not settable). Part of the address is a field assigned only to Simrad. Less significant bytes are different for any Antares PCB manufactured.

3.11.4 TXRX Associated by Default (Fig 3.11.1 – D)

By pressing the relevant button, the following list with all the transceivers connected will be displayed:



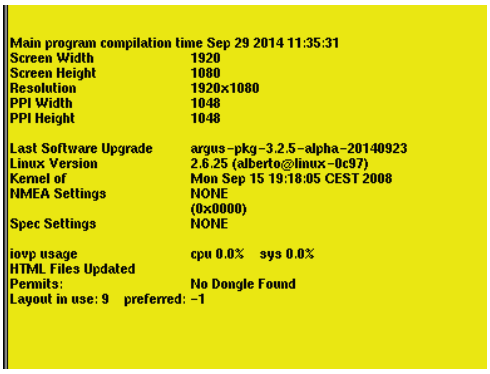
This is not the interswitch, this list selects the TXRX to use at the start-up of the system. For example if the Port Argus Console is normally used with TXRX n 2, the selection "TXRX2" shall be chosen in the left list, and if a blackout occurs or the system is restarted or completely powered off and on again, the Console will automatically select the TXRX n 2 at the restart.

WARNING

IF THE SETUP HAS TO BE TRANSFERRED FROM CONSOLE TO CONSOLE VIA A MEMORY STICK, CHECK THAT THE DEFAULT TRANSCEIVER IS NOT THE SAME FOR ANY OF THE CONSOLES.

3.11.5 General info (Fig 3.11.1 – E)

This window shows information regarding the screen resolution, PPI pixel size and the exact software version installed in the system.



3.11.6 Additional Functions (Fig 3.11.1 – F)

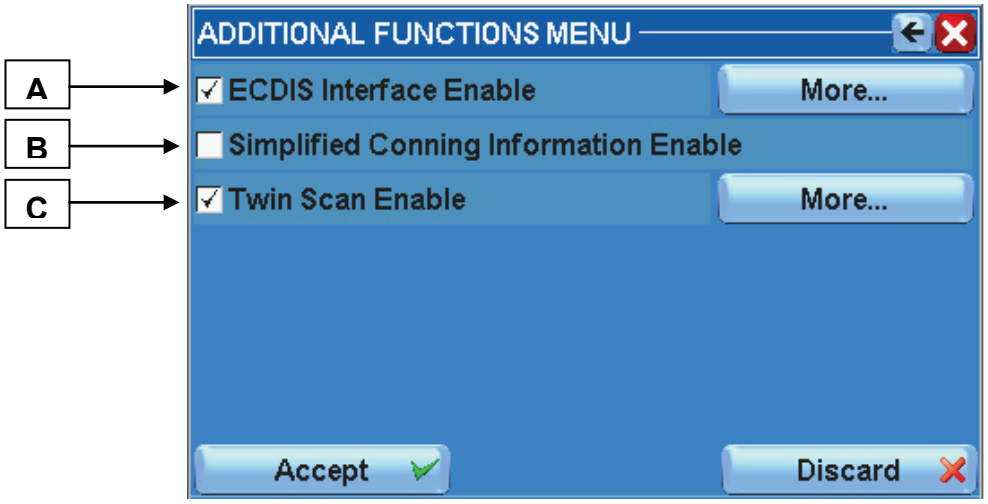


Figure 3.11.6

In this configuration, it is possible to enable, disable or expand the ECDIS, Conning Information and Twin Scan functions.

- **ECDIS interface** (Figure 3.11.6-A)

Selecting/deselecting this function enables/disables transmitting the Overlay video to a connected ECDIS. Clicking on the ”More” button expands the configuration window, and it is possible to see the console for the radar that is enabled at that moment. For more information, refer to the Technical User Manual.

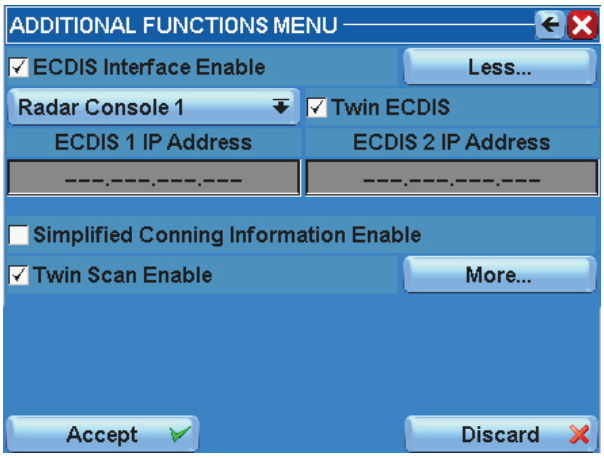


Figure 3.11.6-A

- **Simplified Conning Information Enable** (Figure 3.11.6-B)

Selecting this function enables the Conning Tasks on the System Data Area Section (if the wide screen configuration is being used).

- **Twin Scan Enable** (Figure 3.11.6-C)

Selecting this function enables/disables the Video Combination Mode (if the wide screen configuration is being used) for the video configurations in the TXRX Interswitch menu.

Enabling/disabling the Twin PPI Mode function, which is used to select different radar transceivers for each PPI.

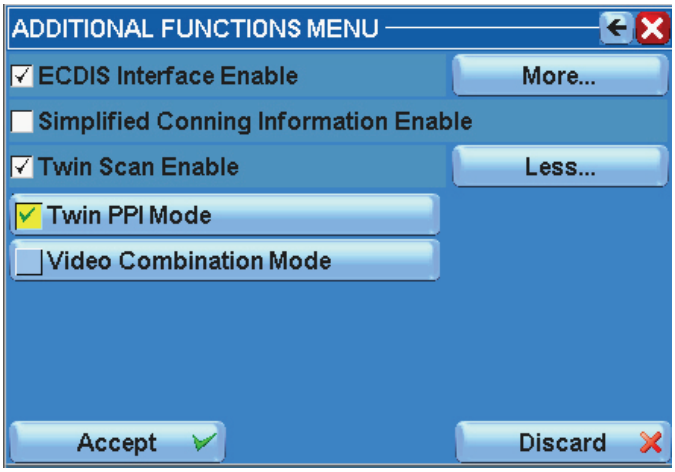


Figure 3.11.6-C

3.12 Restart button

Press this button (Fig 3.1.2 – M, page 3.2), to reboot the Argus system. After pressing the button, another red window will appear asking for a confirmation of the requested action.

Figure 3.12.1

The following actions are applied only after a reboot of the system:

- Display Resolution change
- System Program Version change
- IP Address settings
- Moving the Main Menu column from left to right or from right to left
- Adding or removing the percentage value from the Video Processing Progress Bars

3.13 USB Menu (Fig 3.1.2-N)

By pressing the button, the system will try to mount any memory stick inserted in the USB port, and the following window will be displayed:

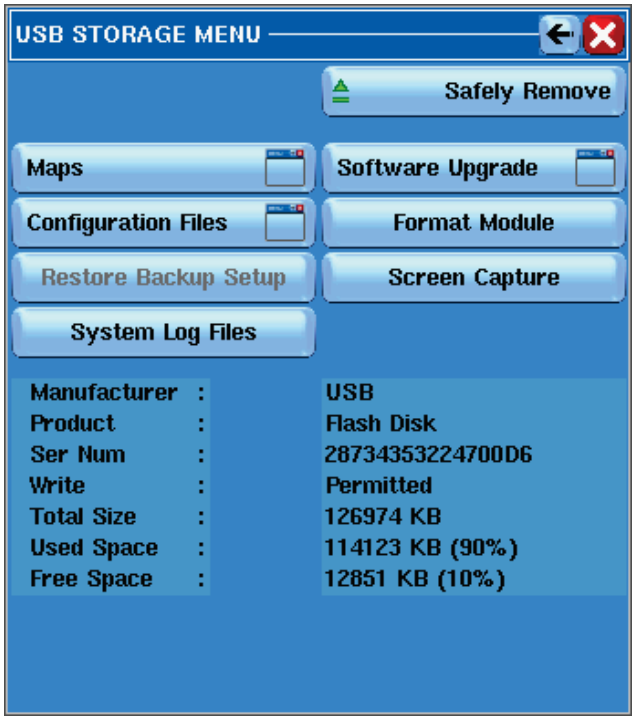


Figure 3.13.1 USB Menu

If no USB memory is connected to the keyboard's USB socket or in case of incompatibility of the USB memory with Linux OS, the above window will indicate: Fail mounting module!

In this case the USB memory installed cannot be used, due to an incompatibility between it and the system.

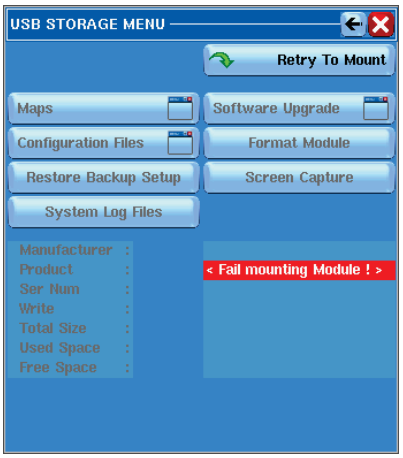


Figure 3.13.2 USB Storage

If the USB memory is used with the ARGUS for the first time, the following window will be displayed:

Figure 3.13.3 USB Storage

To enable the Memory Stick, a directory file tree is needed in the USB memory.
A directory named “ARGUS” shall be created in the root of the USB memory and it should contain other directories named “logs”, “maps”, “screenshots”, “setup”, and “update”.

If this file tree is not present, a warning will appear, and the only action possible will be “Format Module”. This will not erase any files in USB Module, but just create the required directory tree.

By pressing the “Format Module” button, the window will return to the previous, and it will be possible to access the functions.

The USB flash disk will be mounted in /mnt/usb and the USB STORAGE Menu will appear as shown by the following picture.
The figure shows the possibility to store maps, backup setup files, system logs and screenshot pictures on the flash disk and to get maps, backup setup files and to upgrade the Argus software from the flash disk.

This is a list of the sub-directories that can be found under the Argus directory.

- **Maps** : All files *.map.
- **Setup**: Sub-directories named NAME_XXXXX_cfg, where NAME given when it was stored (usually own ship name) and XXXXX is the serial number of the ANTARES p.c.b.
- **Update**: All console update packages.
- **Screenshots**: Screenshots of the display picture in PNG format. Named usually as G/V-SERNUM-YEARMONTHDAY-HOURMINUTES.png, where G or V means a

complete screenshot with all the graphic included and the second one with only the PPI video, SERNUM is the serial number of the Antares PCB and YEARMONTHDAY-HOURMINUTES the date and time in UTC format (from EPFS sensor) of the picture.

3.13.1 Save Screenshots

Figure 3.13.4 Save screenshots

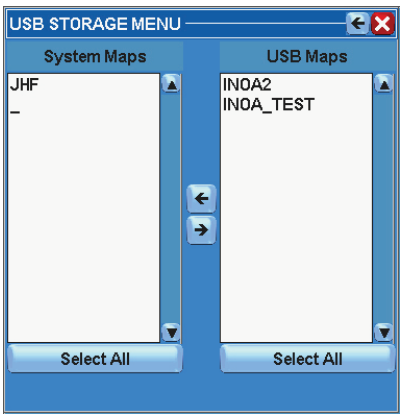
The Screen Capture function allows you to save the views of the radar in order to capture the situation at that particular moment.

- Pressing the "Video radar Only" button, it is possible to save only the radar image at that specific moment.

- Pressing the "Entire Screen" button, it is possible to save the whole image on the display at that specific moment.
- Pressing the "Cancel" button will take you back to the main menu.

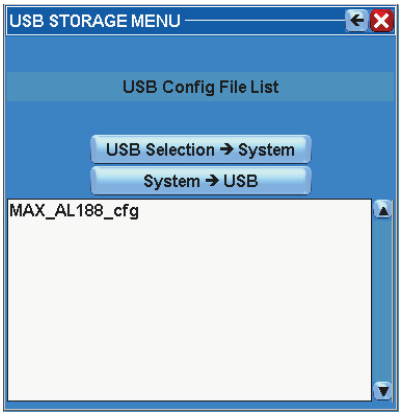
3.13.2 Saving and reloading maps

In this mode, it is possible to save or transfer maps from the Argus system to USB pen drive and vice versa.



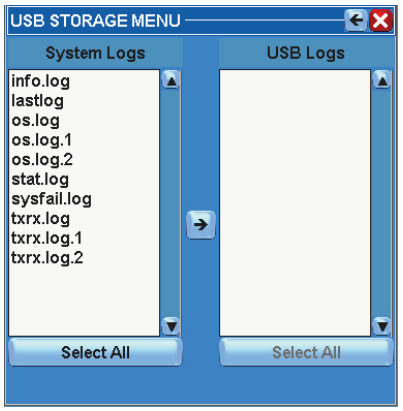
3.13.3 File configuration

In this mode, it is possible to save or transfer system configuration files from Argus to a USB pen drive and vice versa.



3.13.4 System log files

In this mode, it is possible to save or transfer system configuration log files from Argus to a USB pen drive. This is to allow Simrad to have information about the system present on the Argus system. No reverse transfer of data is permitted.



3.14 Stored parameters

All configuration parameters are stored in files that can be stored and retrieved from the memory stick. These parameters are essential for the system, they should be saved in a backup storage or the System Installation Checklist should be filled. **These parameters should be restored when the Antares Assy is replaced.**

Parameter	Stored On	
	Antares PCB	TXRX
Gyro configuration	●	
Log configuration	●	
Own ship dimensions	●	
Ship Tonnage / ROT	●	
Conning position coordinates	●	
EPFS antenna position coordinates	●	
Radar antenna position and type	●	
Sea clutter attenuation shapes	●	
Heading Line Alignment	●	
Trigger/Video delay adjustment	●	
PRESTC Amplitude and Slope		●
PM Opening and Distance		●
Tuning Offset and Indication		●
TXRX communication type and protocol	●	
Startup TXRX selection adjustment	●	
Display Resolution	●	
Function keys configuration	●	
Time configuration (UTC/Local Time	●	
Miscellaneous personal settings	●	
Tasks (Additional PPI, ROT, Depth, Heading etc…)	●	
Twin scan data(combination Types)	●	

3.15 Software Upgrade

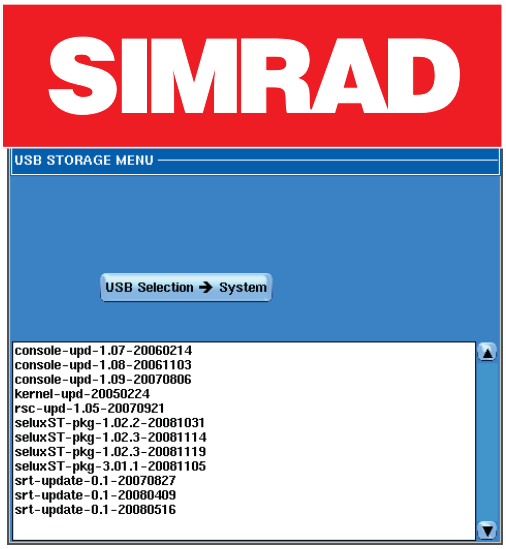
Pressing the SW Upgrade button, the following menu will be displayed. If you need to upgrade the software of the Argus console, choose the relevant Console Update file (normally the latest).

Argus software update packages were historically named as:
selux-pkg-X.Y.Z-YEARMONTHDAY

- but from Argus version 3.2.5 they will be named as:
argus-pkg-X.Y.Z-YEARMONTHDAY

Where X.Y.Z usually is the version, the subversion and the revision of the main application program (MMI), and the Year Month Day number identifies the creation date of the package. Zipped files cannot be used and they should be decompressed before transferred to the memory stick.
Other updates are available like the SRT-update-X.Y.-YEARMONTHDAY and they will be automatically recognized as upgrade files for the SRT and transferred accordingly.

Press the "USB Selection -> System" push button to start the Upgrade.



Another menu window will be displayed with two progress bars showing the state of the upgrade on each processor of the Antares PCB (A and B).

The operator just needs to wait until the progress bars show "Success. Software Updated".

Note that it is possible to read the value 100% in the progress bar, but the upgrading is not terminated until the notice appears.

To run the new software, reset the system by the Restart button in the Radar Setup Menu or just by resetting the Antares Assy.

CHAPTER 4
DEBUG AND SIMULATION FACILITIES

4.1 General information

Simulation

The first part of this menu is dedicated to simulation facilities:

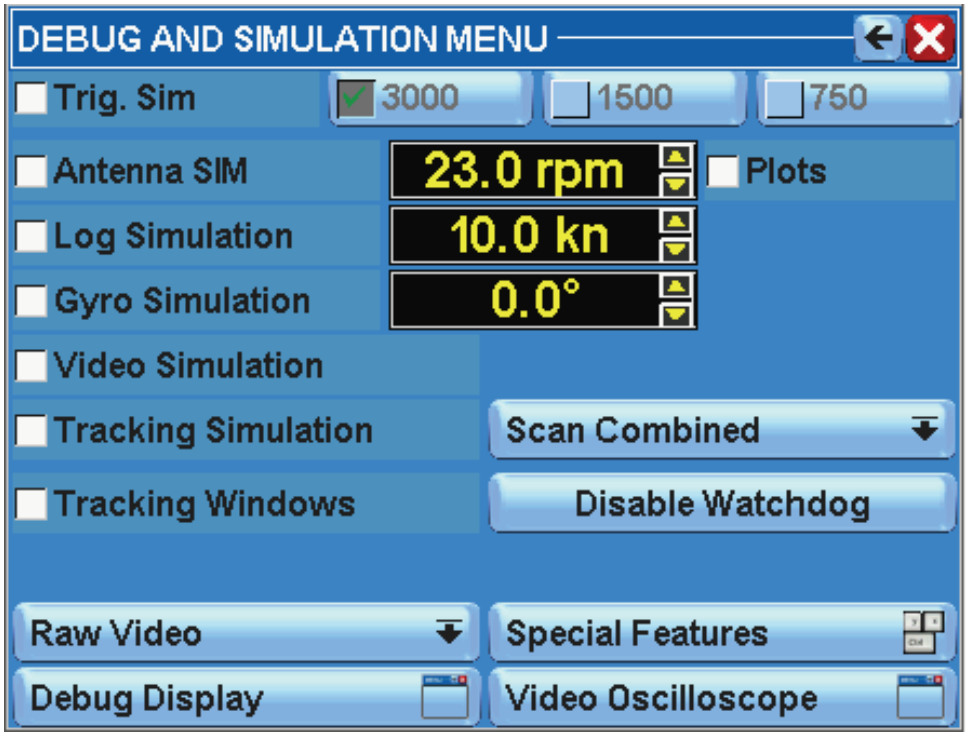


Figure 4.1.1 Debug and simulation menu

- **Trigger,** if the transceiver is in failure, it is possible to test most of the functions of the display just by choosing a PRF to be simulated, in the first row of the menu.

- **Antenna,** if not available for some reason, just press "Antenna Sim" and setting the correct antenna speed.

- **Speed Log,** when speed log is not working, just select this window "Log Simulation and set the correct speed.

WARNING

THIS IS NOT THE SAME AS MANUAL SPEED. THIS IS A SIMULATION AND IF YOU CHOOSE THIS FACILITY, THE SYSTEM WILL ALSO STOP RECEIVING DATA FROM A CONNECTED EPFS, BUT WILL CALCULATE THE SHIP'S POSITION USING THE SPEED YOU INSERTED.

- **Gyro:** when this function is selected, the gyro compass function is simulated**.** The adjacent window serves to vary the angle between the ship and geographic north.

- **Video:** selecting this window reproduces the interferences and background noises relevant to the situation to be simulated**.**

- **Tracking:** video simulation of up to 40 targets to test the tracking function.

Video Selection

This facility is used only to test the system, and it must be returned to "Raw Video" at the end of the test.

- **Raw Video:** Is the normal video.

- **Quantized Video:** This is the on-off video used by the ARPA for tracking. For testing the Q.V. can be used to see if the ARPA sees all the echoes and if the Q.V. threshold is correctly adjusted, or if the auto adaptive one works at satisfaction. To tell if it is working fine, all the echoes should be visible in raw video plus some noise speckles around.

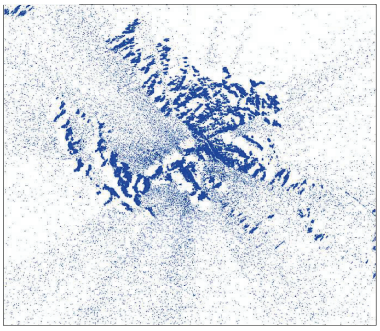
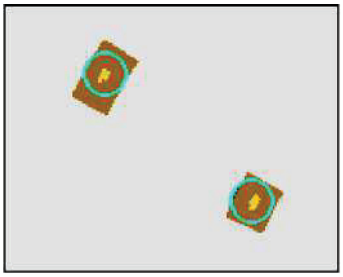


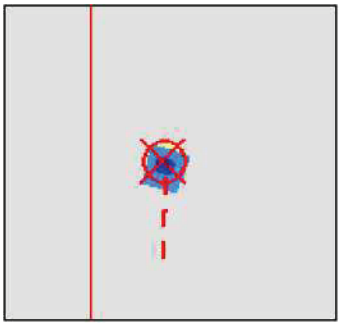
Figure 4.1.2 Video view

- **Video Plot:** On the PPI, only the video of the plotted targets will be displayed. It could be necessary to use it when ARPA loses an acquired target, to see if it is present under the acquired target during the plot.

In the picture, the video plots are the yellow echoes under the tracks and the light brown rectangles are the tracking windows.

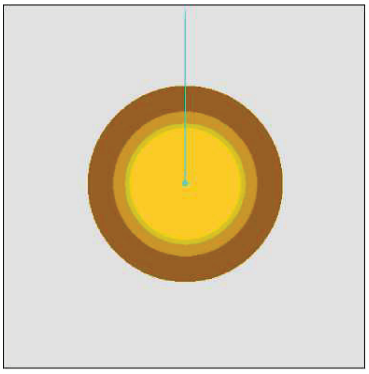


- **Video Test:** On the PPI, only the video generated by the Training function will be displayed, available in the ARPA and AIS Menu. It is interesting to see it when using the Training function. In the picture, a flashing cyan drawn cross is shown on the plot, which means that it is the training target. The light brown rectangle is the tracking window, normally not displayed.



- **Anti Sea Clutter:** On the PPI, some concentric circles filled with different levels of yellow colour will be displayed, showing the intensity of the threshold of clutter suppression, according to the used shape.

In the zone of the strongest yellow, the anti sea clutter suppresses more video than in the zone of the light brown. By increasing the STC control, the circles will expand, indicating that the clutter suppression is moved out in range.



Tracking Window

By activating this control, it will be possible to see the windows where the tracking is checking for targets. For more information regarding the tracking windows, refer to the Video Selection section and see the Video Plot and Video Test pictures.

Plots
This control will show the plot symbols.

Video Bank Selection
By this function, the user can select five types of video visualization:

- **Scan Combined = Shows the combination of all the video banks.**
- **Scan A Bank = Shows radar video of bank A.**
- **Scan B Bank = Shows radar video of bank B.**
- **Scan RT Bank = Shows radar video of the Relative Trails bank.**
- **Scan TT Bank = Shows radar video of the True Trails bank.**

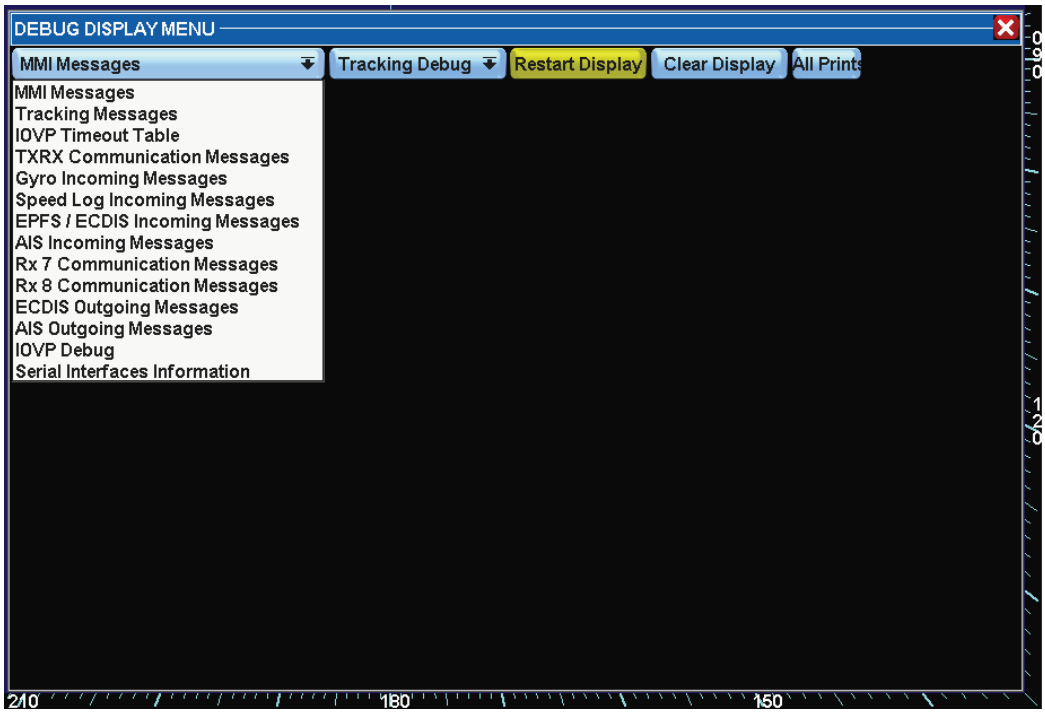
Special Features
By pressing the relevant button, the system will ask for a password. There are several special features in the system, and each one has a different password. Enter the password "**nmea**" using the alphanumerical keypad to access the Debug Display.

Video Oscilloscope
This button opens a menu where it is possible to see the video input of the Antares p.c.b., this facility is meant to see the video amplitude.
The video will be sampled at the EBL position for each scan and the VRM mark will be displayed as a range reference.
The oscilloscope can be configured in Spread mode, where the video is sampled equally spaced sixteen times a scan.
On the right list, it is possible to select between different modes of presentation:

1. Video Integrated in different scans
2. Maximum of different scans
3. Maximum and Minimum of different scan

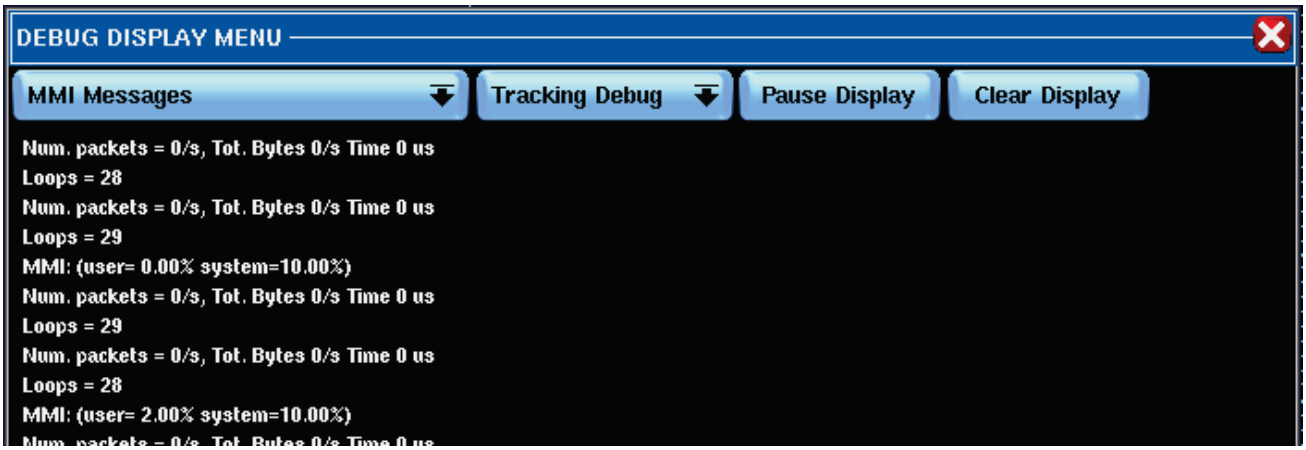
Debug Display

Press the Debug key to access the display for checking various messages and in- and output data.

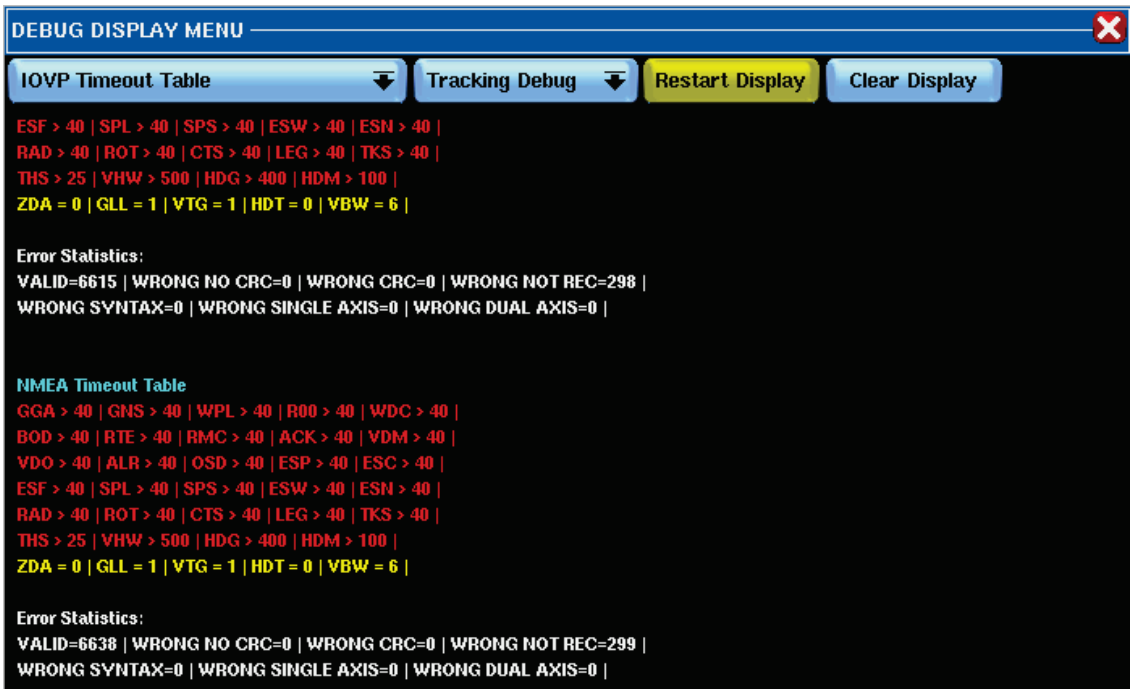


By pressing the first button on the left, MMI Messages, a list will be displayed with all available messages:

- **MMI Messages,** the standard print-outs of the MMI program, ex. CPU load.



- **IOVP Timeout Table,** prints all the names of the sentences accepted, and next to the names a number, 0 means sentence still received regularly, 1 means sentence in timeout. This message also prints a statistic of the error for which the sentences have been refused.

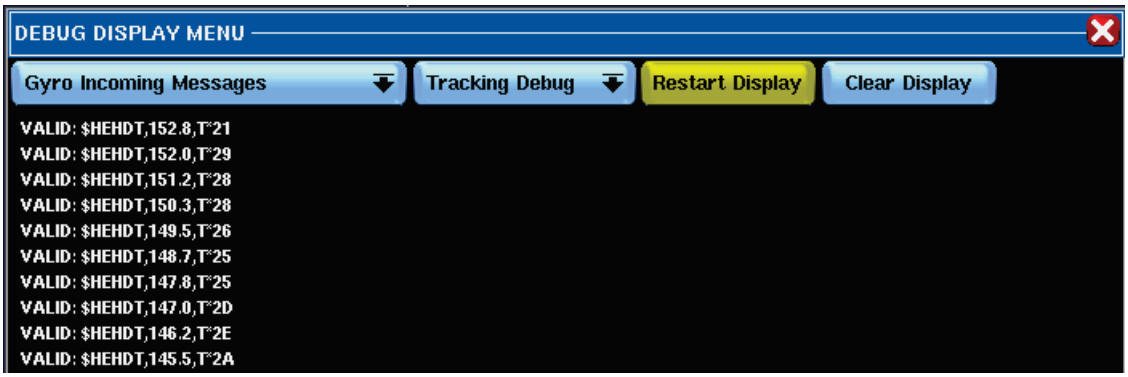


- **TXRX Communication Messages,** prints all the sentences transmitted between the display console and the TXRX. The commands from the display to the transceiver are written in white colour and the status from the TXRX in cyan.

CRC error discarded sentences are marked in yellow. Unrecognized sentences are marked in red.

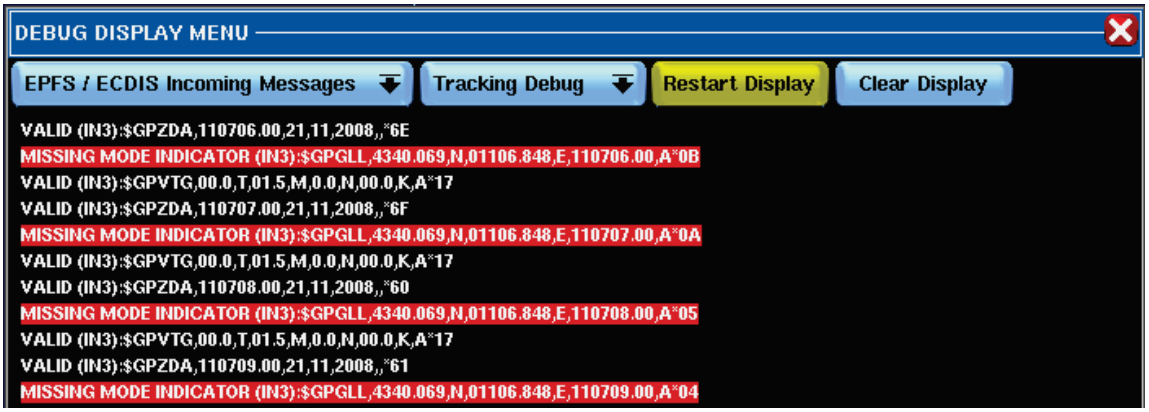
- **Gyro Incoming Messages,** prints all sentences received on the Gyro port TB9.

- **Speed Log Incoming Messages,** prints all sentences received on the Speed Log port TB2.



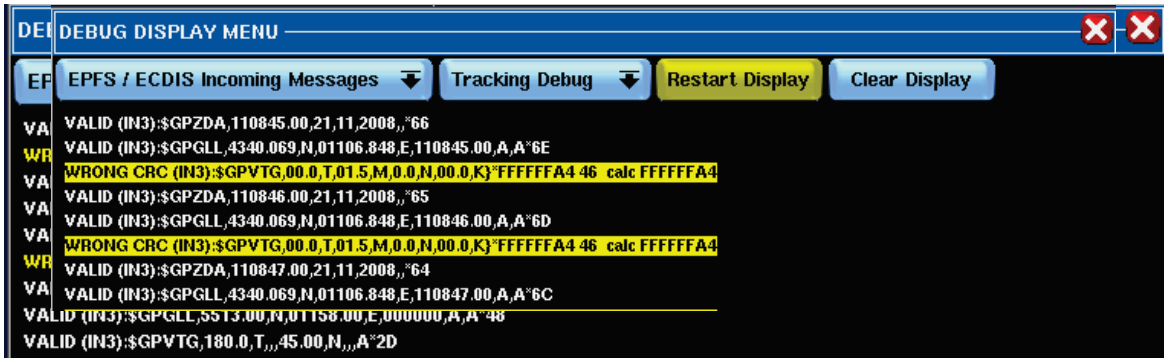
- **EPFS /ECDIS Incoming Messages,** prints all sentences received on the EPFS/ECDIS port TB3.

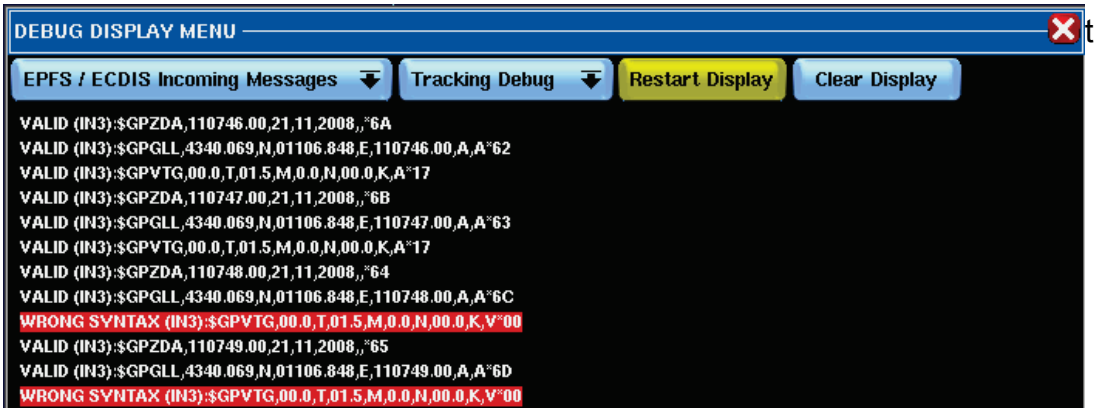
In the following pages, some screenshots are shown to explain how the sentences are colour coded. Yellow background colour indicates sentences not accepted because of incorrect CRC.

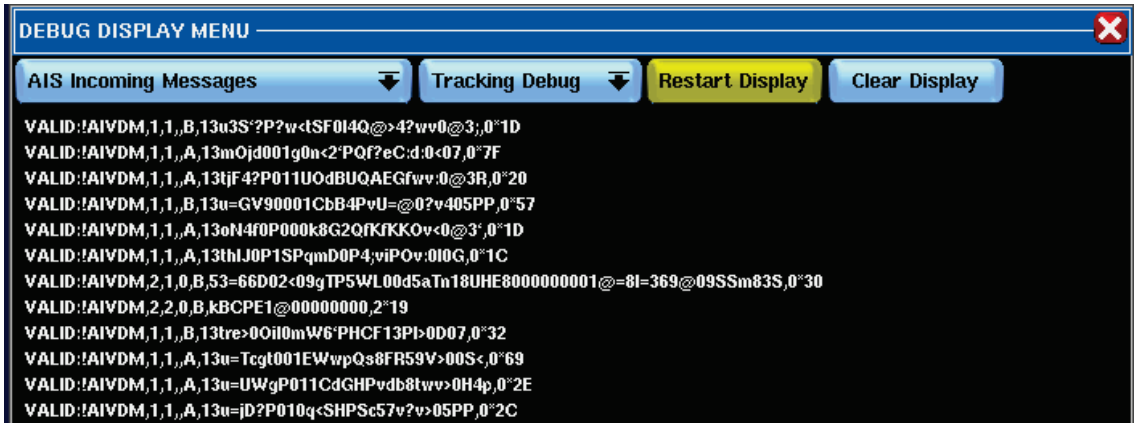


Red background colour indicates sentences not accepted because of wrong syntax or fields missing.

Yellow printed sentences are for many reasons simply not recognized, for example the VMVBW is not accepted because the Log was configured as serial single axis with VHW as the only valid sentence.





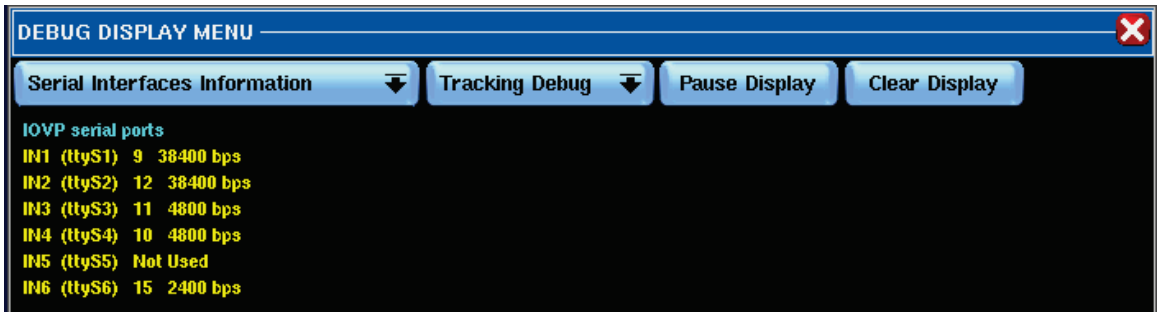


- **RX7 Communication Messages – RX8 Communication Messages** In these positions, the sensors enabled in the configuration window “Unconventional sensor Cfg” (Cap 3.6) are displayed.

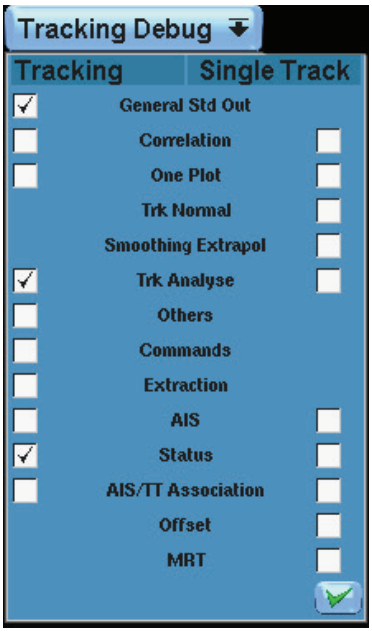
- **ECDIS Outgoing Messages,** prints all sentences outgoing from the radar, normally used by ECDIS or INS, such as RATTM, RAALR, RARSD, and RAOSD.

- **AIS Outgoing Messages,** prints the sentences AISACK, when generated by a manual acknowledge of AIS error.

- **Serial Interfaces Information,** prints information about the serial connections, file descriptor number and baud rate. See the serial table in Chapter 2 for a summary of serial line port numbers and Terminal Boards on the Antares PCB



- **Tracking debug:**
  the standard messages of the tracking program. For these messages, it is possible to add all the debug tracking prints. It is possible to activate the tracking debug just by pressing the "Tracking Debug Off" button and selecting one of the options available. Every target selected from that moment will be the source of this debug information.



(Function available in Tracking Messages mode only)

CHAPTER 5
TROUBLESHOOTING

5.1 Introduction

This chapter provides the procedure that must be followed in order to replace a failed component of the Argus system.

5.1.1 Safety Precautions

If not otherwise specified in the procedures, during the corrective maintenance operations, the following safety rules must be observed:

Each maintenance operation must be carried out only after the equipment is switching off.

WARNING
SET THE MAIN BREAKER OF THE EQUIPMENT TO OFF, AND HANG UP A PLACARD READING "WORK IN PROGRESS DO NOT SWITCH ON".

Before removing any component, be sure the spare part is available.
Verify the integrity of the spare part and, if possible, perform a functional test.

5.1.2 Personnel

Only skilled personnel with a good knowledge of the equipment may carry out service and replace parts.

5.2 Required Tools and Instruments

To carry out the operations described in this chapter, only normal workshop tools (as screwdrivers, wrenches etc.) are required.
The tools required to perform the operations are:

- set of cross and slotted screwdrivers;
- set of socket and torx wrenches;
- scissors;
- Tweezers.

5.3 Corrective Maintenance Procedures

This paragraph provides a detailed description of the operation to be carried out in order to replace a damaged component. Table 5.1 lists the Corrective Maintenance Procedures.

Para	Component to be replaced
5.4	**Corrective Maintenance Procedures on DISPLAY CORE Unit**
5.4.1	**DISPLAY CORE UNIT Cover Removing and Installation**
5.4.2	**Alpha Expansion Board Replacement (optional)**
5.4.3	**ANTARES Assy Replacement**
5.4.4	**Alpha Board Replacement**
5.4.5	**Line Filter Replacement**
5.4.6	**P.S. Assy Replacement**
5.4.7	**Fans Assy Replacement**
5.5	**Corrective Maintenance Procedures on the Monitor Unit**
5.6	**Corrective Maintenance Procedures on the Keyboard Unit**

Table 5.1 – List of Corrective Maintenance Procedures

5.4 Corrective Maintenance Procedures on DISPLAY CORE Unit

5.4.1 DISPLAY CORE UNIT Cover Removing and Installation

Required Tools

Torx wrench T20

Removing (Figure 5.1)

1. By means of the proper Torx wrench, loosen the screws (pos.1) fixing the cover (pos. 2)
   Remove the cover.

Installation

In order to install the cover, perform the removing operation in reverse order.

5.4.2 Alpha Expansion Board Replacement

Required Tools

Set of screwdrivers
Socket wrench 5,5 mm

Removing (Figure 5.2)

1. By following the procedure of Para 5.4.1, remove the DISPLAY CORE UNIT cover.
2. Remove the BNC and SMB connectors and all the terminals connected to the board. Take note of their position.
3. Remove the flat cable. Take note of its position.
4. By means of the 5, 5 mm socket wrench, loosen and remove the nuts (pos. 1) fixing the board (pos. 2).

Remove the board.

Installation

In order to install the new board, perform the removing operation in reverse order.

5.4.3 ANTARES Assy Replacement

Required Tools

Socket wrench 7 mm
Torx wrench T20

Removing (Figure 5.3)

1. By following the procedure of Para 5.4.1, remove the DISPLAY CORE UNIT cover.

Remove the SMB connectors, the flat cable and all terminal boards connectors connected to the board. By taking note of their position.
By means of the 7 mm socket wrench and the T20 Torx wrench, loosen the nuts (pos. 2) and screws (pos. 1) fixing the board (pos. 3).

Remove the assy.

Installation
In order to install the new assy, perform the removing operation in reverse order.

5.4.4 Alpha Board Replacement

Required Tools

Socket wrench 5,5 mm

Removing (Figure 5.4)

1. By following the procedure of Para 5.4.1, remove the DISPLAY CORE UNIT cover.

By following the procedure of Para 5.4.2, remove the ALPHA Expansion Board and remove the hexagonal spacers, if that's mounted.
Remove the terminal board's connectors, the BNC and SMB connectors and the flat cable from the board. Take note of their position.
By means of the 5,5 mm socket wrench, loosen and remove the nuts (pos. 1) fixing the board (pos.2).

Remove the board.

Installation
In order to install the new board, perform the removing operations in reverse order.

5.4.5 Line Filter Replacement

Required Tools

Socket wrench 7 mm.

Removing (Figure 5.5)

1. By following the procedure of Para 5.4.1, remove the DISPLAY CORE UNIT cover.
2. By following the procedure of Para 5.4.3 remove the Antares assy.

Remove the fast-on terminals of the filter. Take note of their position.
By means of the proper 7 mm socket wrench, loosen and remove the nuts (pos. 1) fixing the Line Filter (pos.2).

Remove the Line Filter.

Installation
In order to install the new Line Filter, perform the removing operation in reverse order.

5.4.6 P.S. Assy Replacement

Required Tools

Socket wrench 7 mm.
Set of screwdrivers.

Removing (Figure 5.5)

1. By following the procedure of Para 5.4.1, remove the DISPLAY CORE UNIT cover.
2. By following the procedure of Para 5.4.3 remove the Antares assy.
3. By means of the proper 7 mm socket wrench, loosen the nuts (pos. 3) fixing the P.S. Assy (pos. 4), remove the terminal board plastic cover protection and by means of the proper screwdriver, remove all the wires. Take note of their position.
4. Remove P.S. Assy

Installation
In order to install the new P.S. Assy, perform the removing operation in reverse order.

5.4.7 Fans Assy Replacement

Required Tools

Torx wrench T10.
Scissor.

Removing (Figure 5.6)

1. By following the procedure of Para 5.4.1, remove the DISPLAY CORE UNIT Cover.
2. By following the procedure of Para 5.4.3 remove the Antares assy.
3. By means of the scissor cut the cable ties fixing the fans cable.
4. By means of the T10 Torx wrench, loosen and remove the screws (pos. 1) fixing the Fans Assy (pos. 2).
5. Remove the Fans Assy.

Installation
In order to install the new filter, perform the removing operation in reverse order.

Fig 5.1 Display core unit

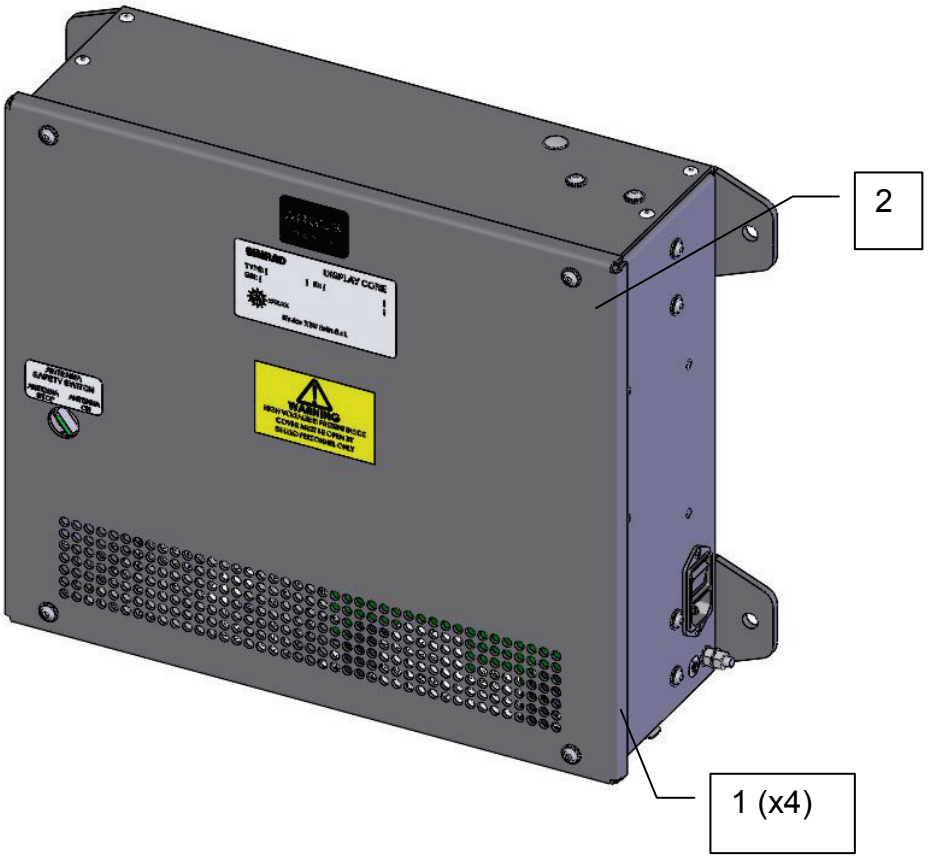


FIG. 5.2 Display core unit

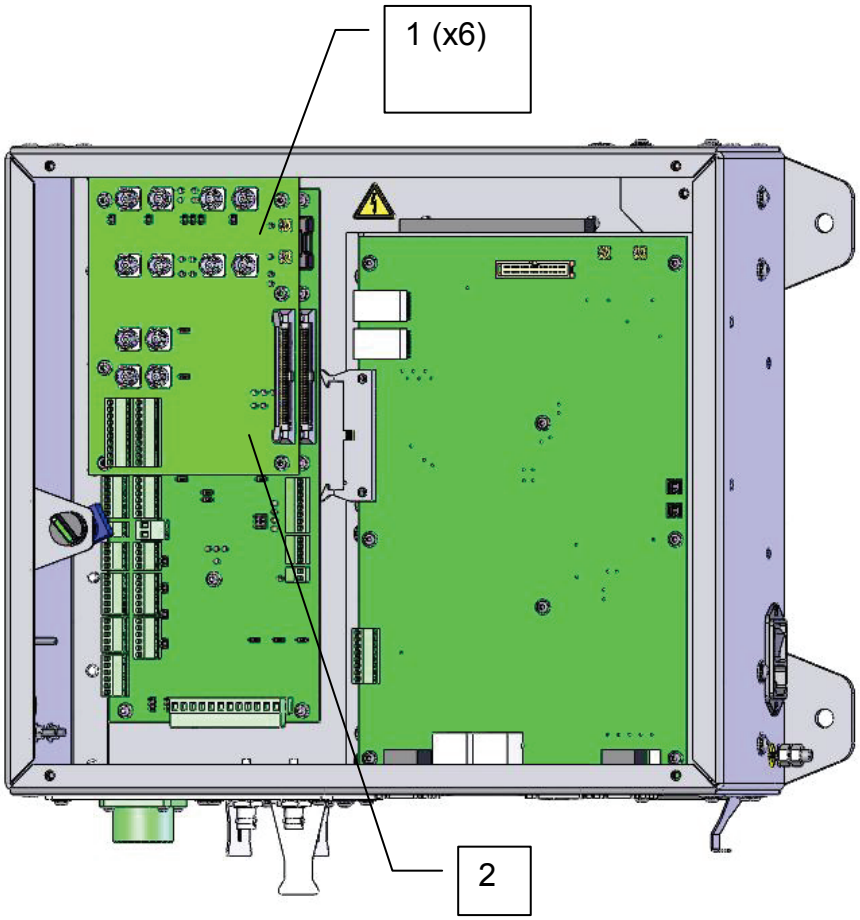


FIG. 5.3 Display core unit

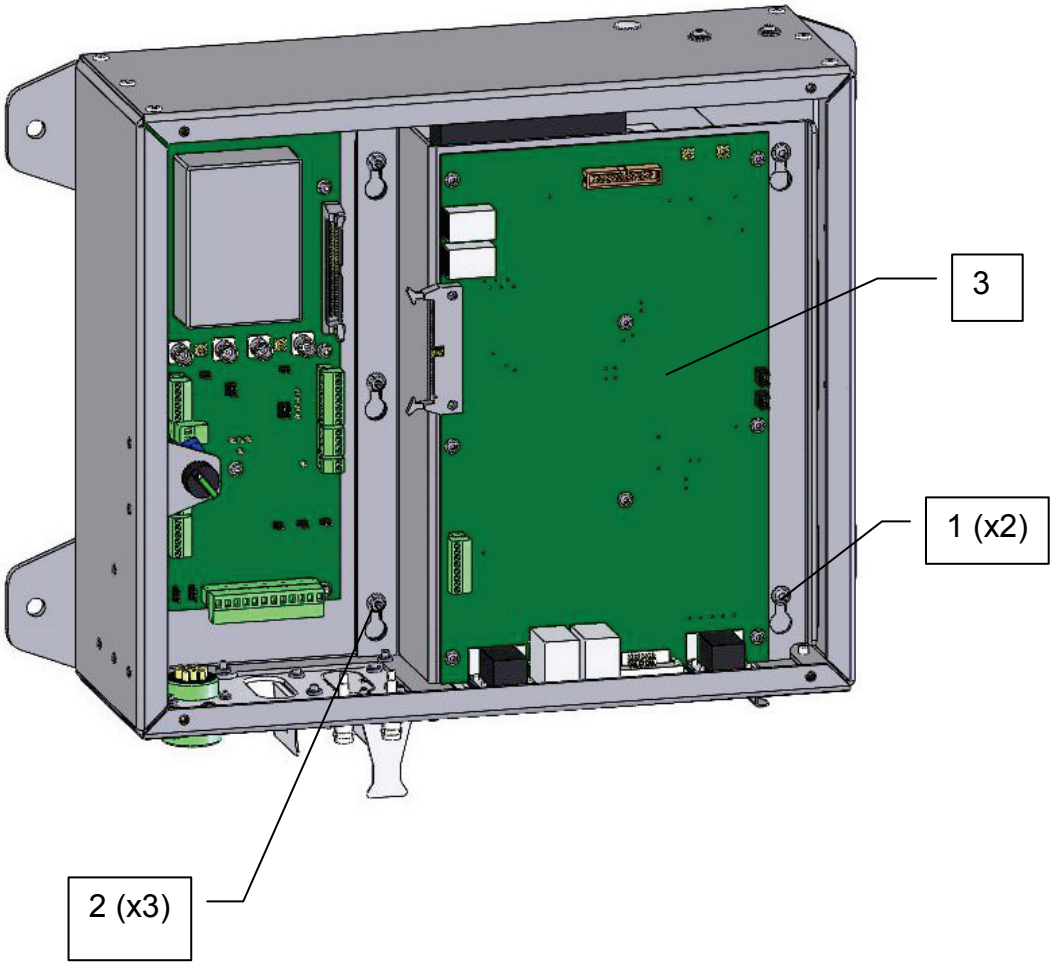


FIG. 5.4 Display core unit

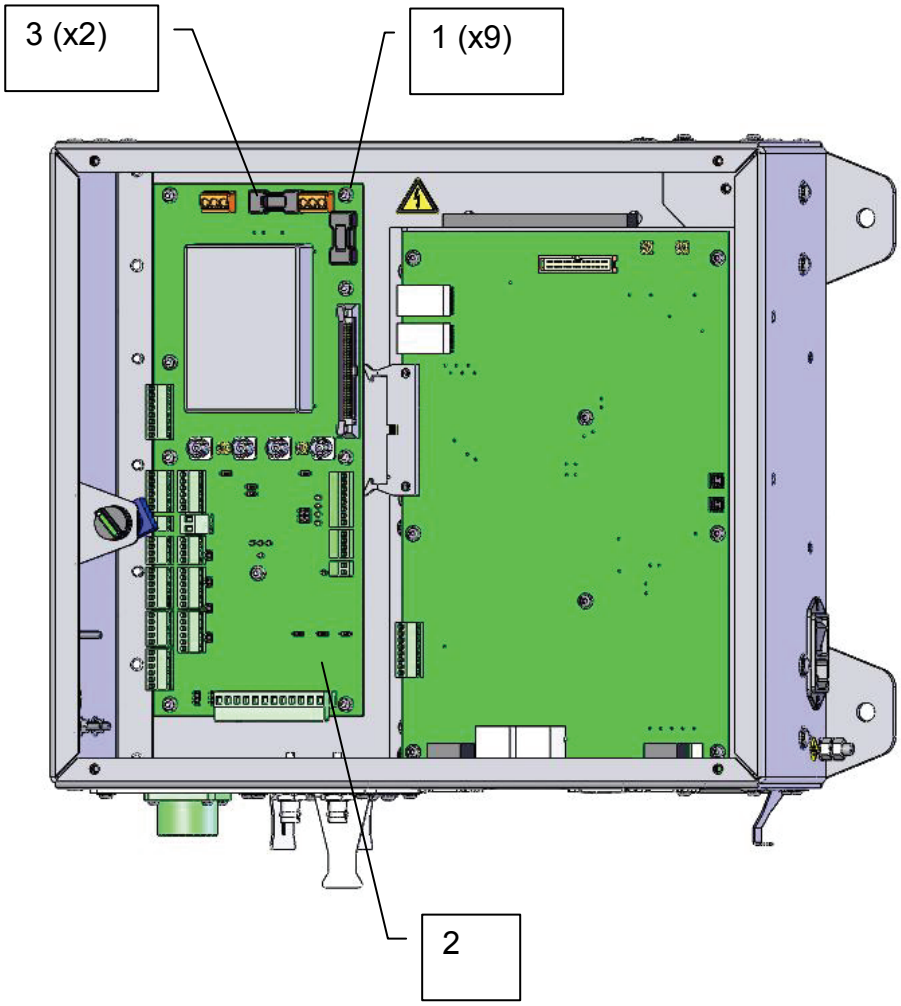


FIG. 5.5 Display core unit

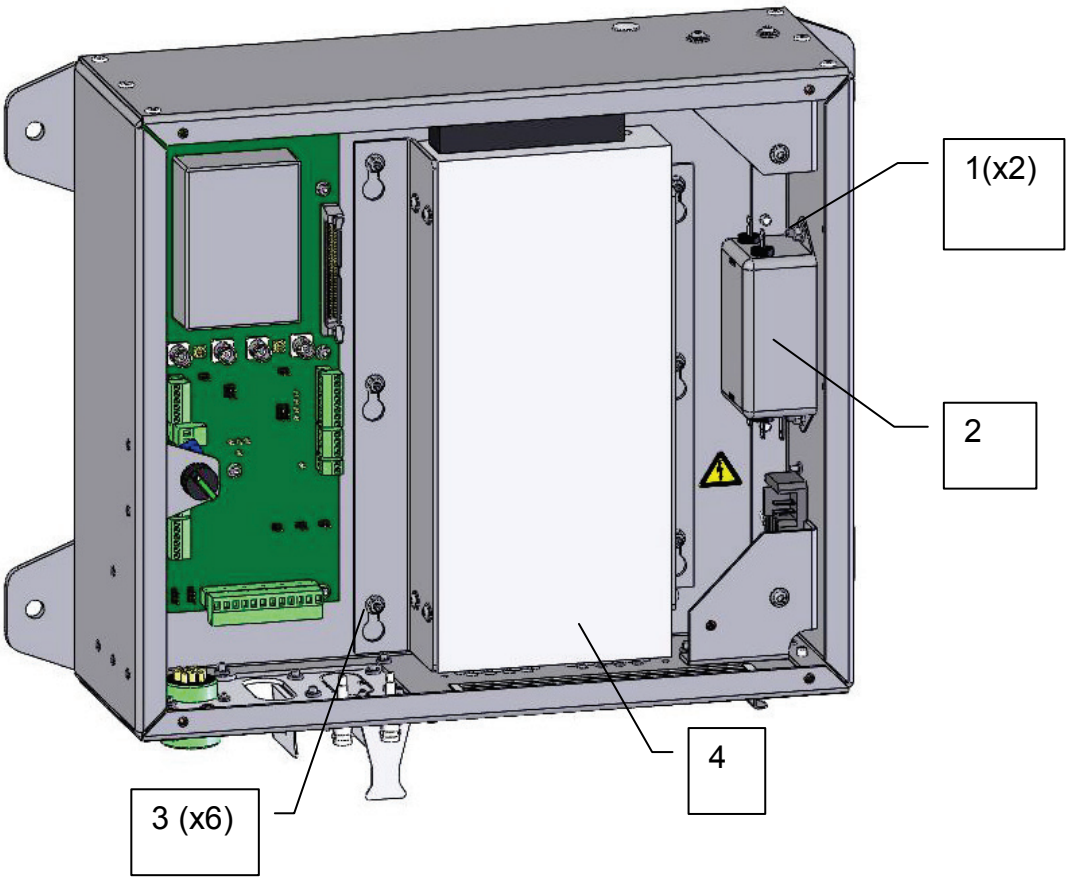
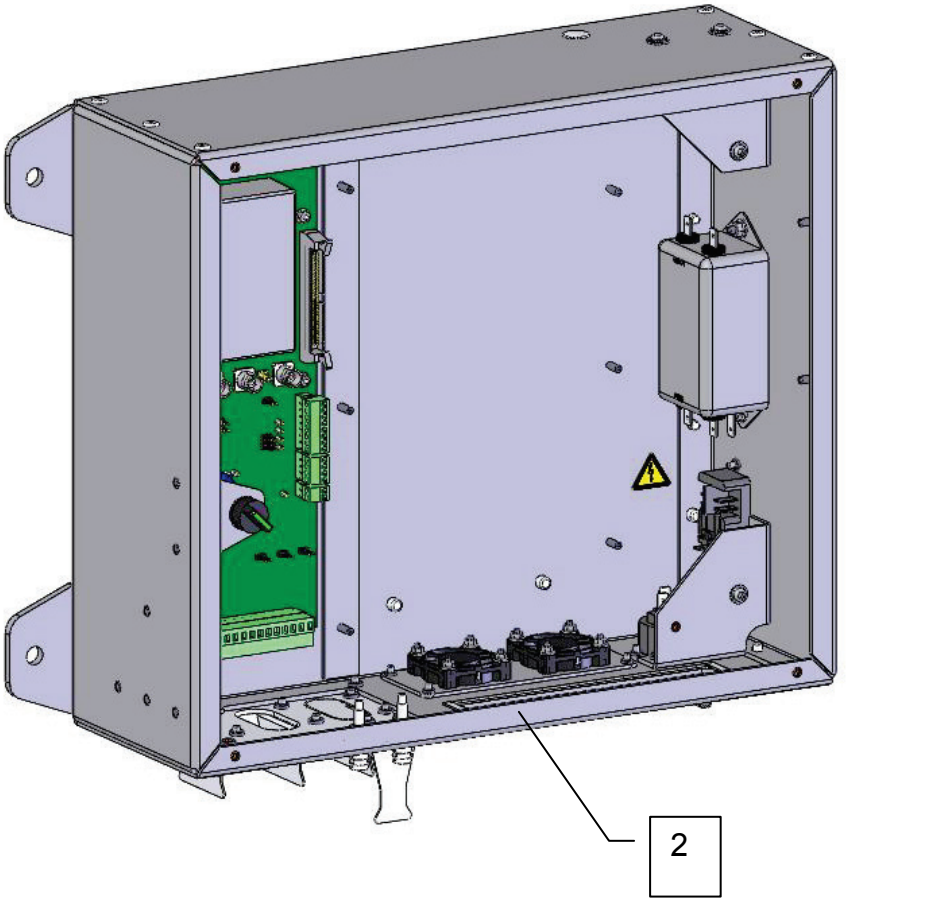


FIG. 5.6 Display core unit



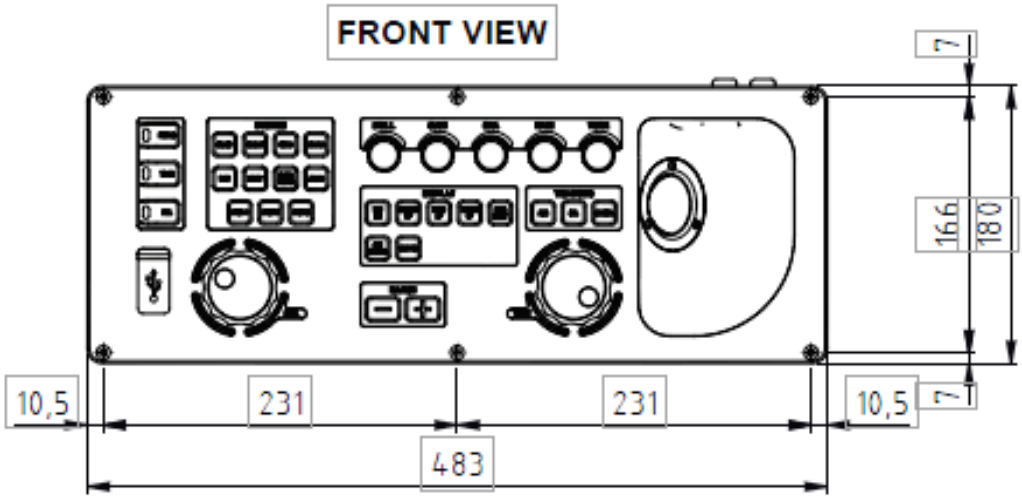
5.5 Corrective Maintenance Procedures on the Display Unit

In case of Monitor failure, refer to the Monitor Technical Manual.

5.6 Corrective Maintenance Procedures on the Keyboard Unit

In case of Keyboard failure, contact your local Simrad dealer.

FIG. 5.7 Keyboard Unit



5.7 Introduction

This chapter provides a list of the Argus system's replaceable parts.

5.7.1 Parts List

The parts list is divided into major assemblies. All parts attached to the assemblies are listed in Parts List Tables. The Parts List Tables consist of eight columns as follows:

- Column 1: POS. (Position): the column reports the replaceable parts position in the reference figure.
- Column 2: DESCRIPTION: the column includes the descriptive identification data of the replaceable part.
- Column 3: DRAWING SPECIFICATION NUMBER OR TYPE: the column reports the drawing specification number or the type of the replaceable part assigned by the supplier.
- Column 4: REQUIRED QUANTITY (N): the column indicates, for each replaceable part, how many of them are assembled on the equipment.

5.7.2 Parts Location Illustration

The following Figures provide the location of the components. Each figure is related to a Replaceable Parts List table. The position numbers of items shown in the figures are referenced in the related Parts List Tables.

5.7.3 Parts List Tables

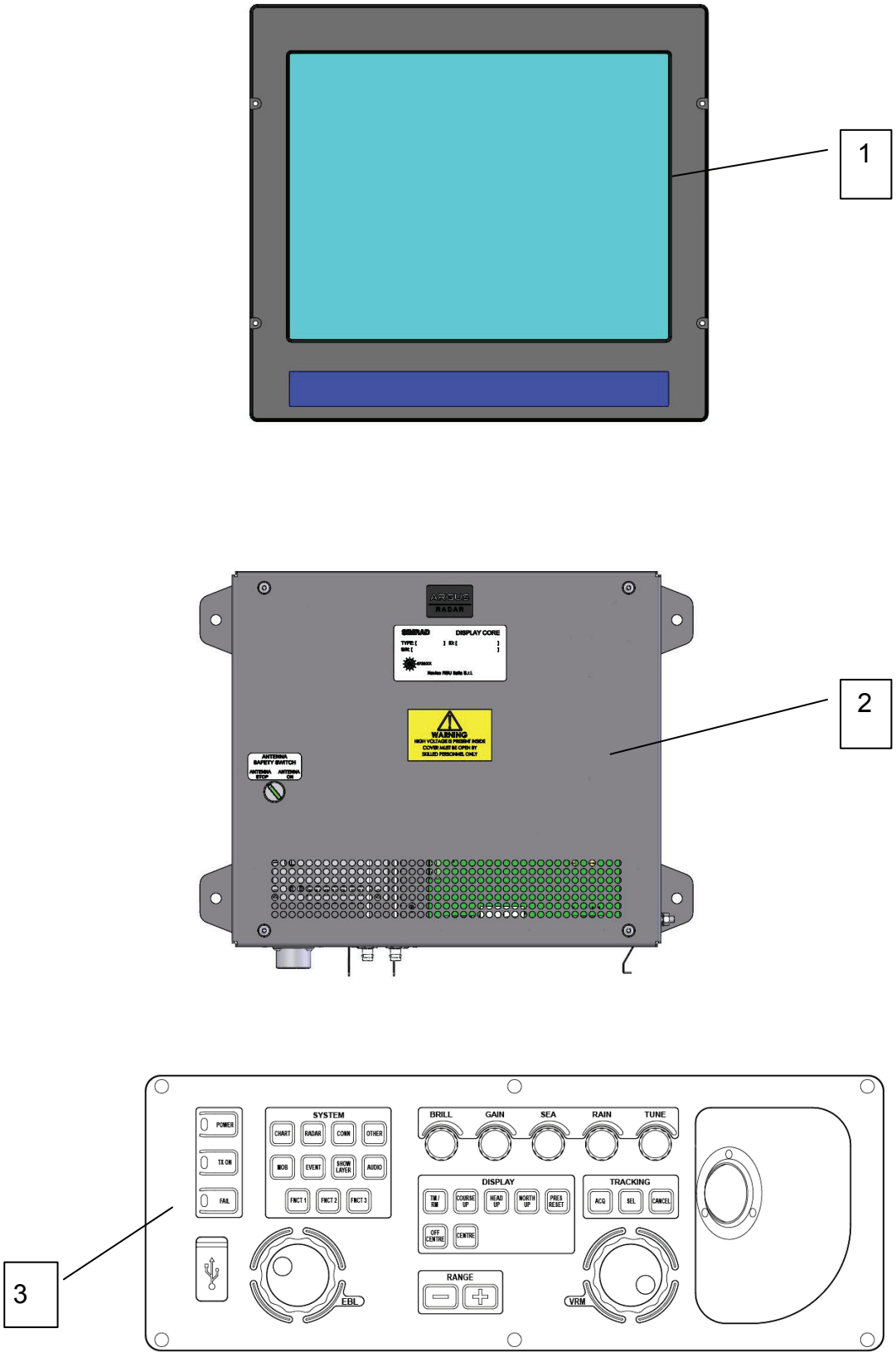
List of the Units

Pos. Fig.5.8	Description	Drawing Specification Number or Type	Required Quantity (N)
1	Simrad M5016	000-12209-001	1
1	Simrad M5019	000-12210-001	1
1	Simrad M5024	000-11781-001	1
1	19” MMD SER 1ACRAL9011	000-10632-001	1
1	23” MMD SER 1ACRAL9011, LED BACKLIGHT	000-10633-001	1
1	26” MMD SER 1ACRAL9011, WIDE SCREEN	000-11570-001	1
2	Core unit for Argus 120/240 VAC w/DOCS	000-10330-001	1
3	Multifunction Control Panel	000-11855-001	1

List of Items of DISPLAY CORE Unit

Pos.	Description	Drawing Specification Number or Type	Required Quantity (N)
2	ANTARES ASSY	000-10688-001	1
3	ALPHA PCB ASSY	000-10691-001	1
4	ALPHA EXPANSION PCB ASSY	000-10690-001	1
6	POWER SUPPLY ELECTRONIC UNIT	000-10689-001	1

FIG. 5.8 ARGUS Units



5.8 System lifetime

Column 5: LIFETIME: the column indicates, the lifetime for replaceable part.

List of the Lifetime of ARGUS

Pos.	Description	Part no.	Refer to	LIFETIME K Hours
1	19” MMD SER 1ACRAL9011	000-10632-001		50
1	23” MMD SER 1ACRAL9011, LED BACKLIGHT	000-10633-001		50
3	POWER SUPPLY ELECTRONIC UNIT	000-10689-001	1	48

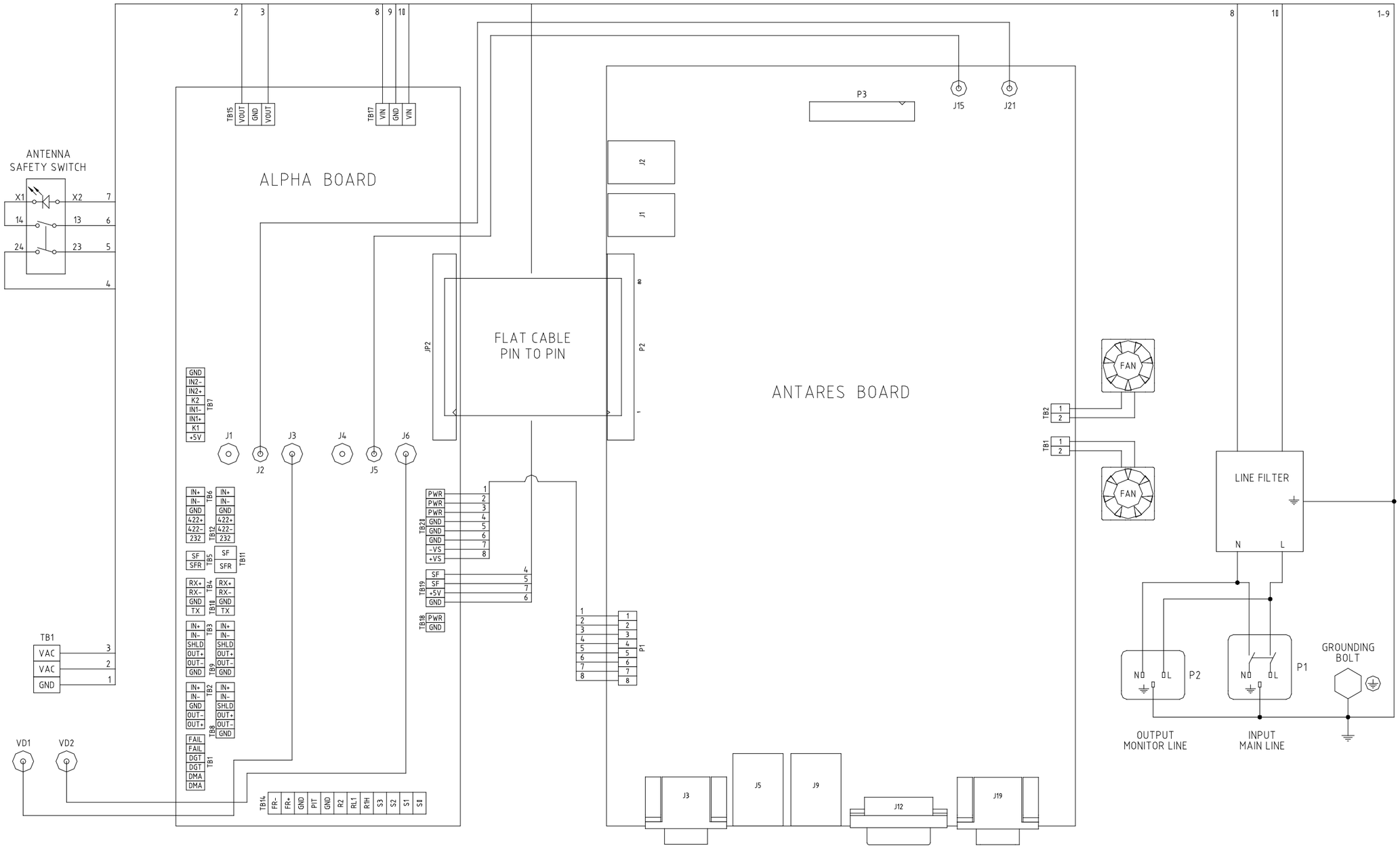
List of Lifetime of SRT Transceiver and SRT Pedestal

Pos.	Description	Part no.	Quantity (N)	LIFETIME K Hours
1	12&25 kW SRT Gear Reducer	000-10682-001	1	20
1	12&25 kW Motor	000-10683-001	1	20
2	SRT Transmission Gear Assy	000-10744-001	1	40
3	SRT Transmission Bearing 90 x 55 x 18	000-10745-001	1	40
4	SRT Transmission Bearing 95 x 60 x 18	000-10746-001	1	40
5 A	12 kW Magnetron JRC MSF1425A	000-10676-001	1	12 *
5 C	25 kW Magnetron JRC MSF1475A	000-10677-001	1	7 *

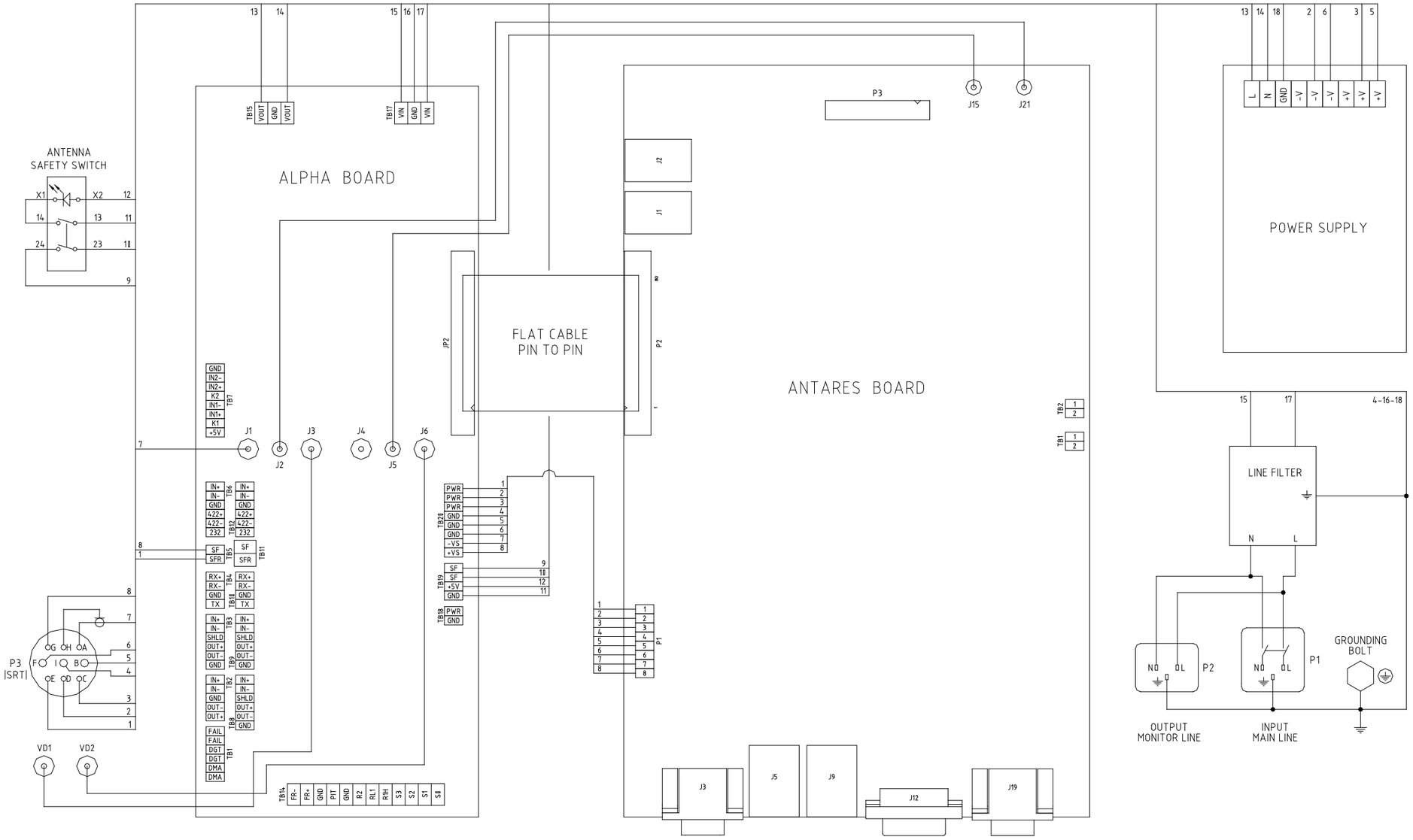
*Estimated, depending on use

WARNING
ALL COMPONENTS INDICATED IN THE TABLE SHOULD BE REPLACED BEFORE THE EXPECTED LIFETIME EXPIRES.

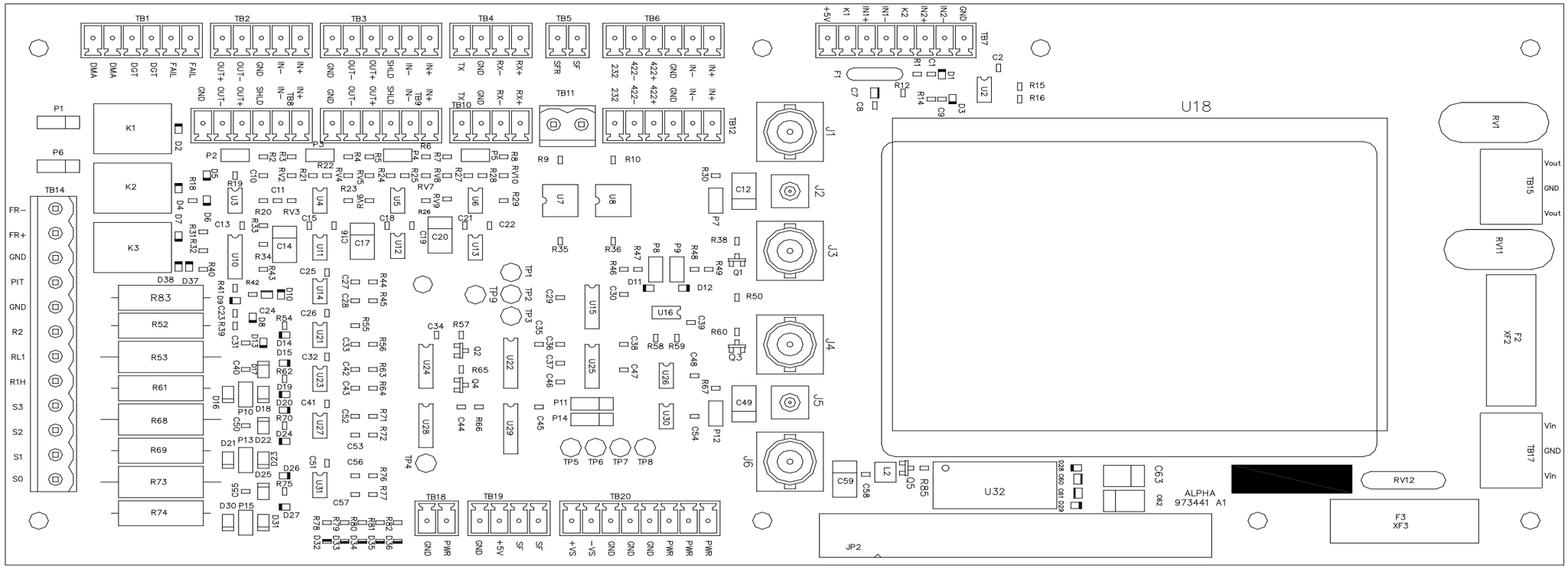
CHAPTER 6 ANNEX A



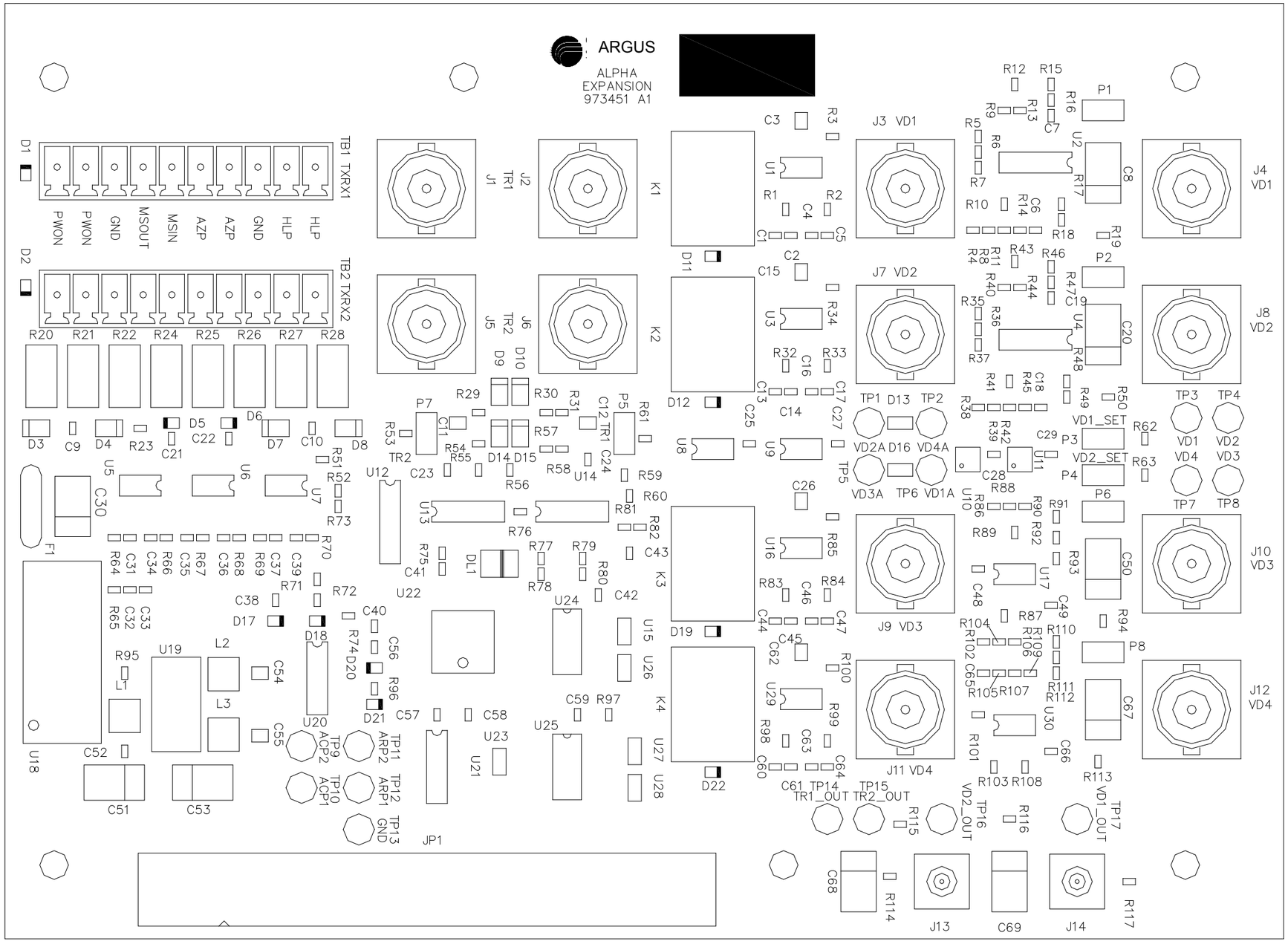
Display Core Unit Internal Connection



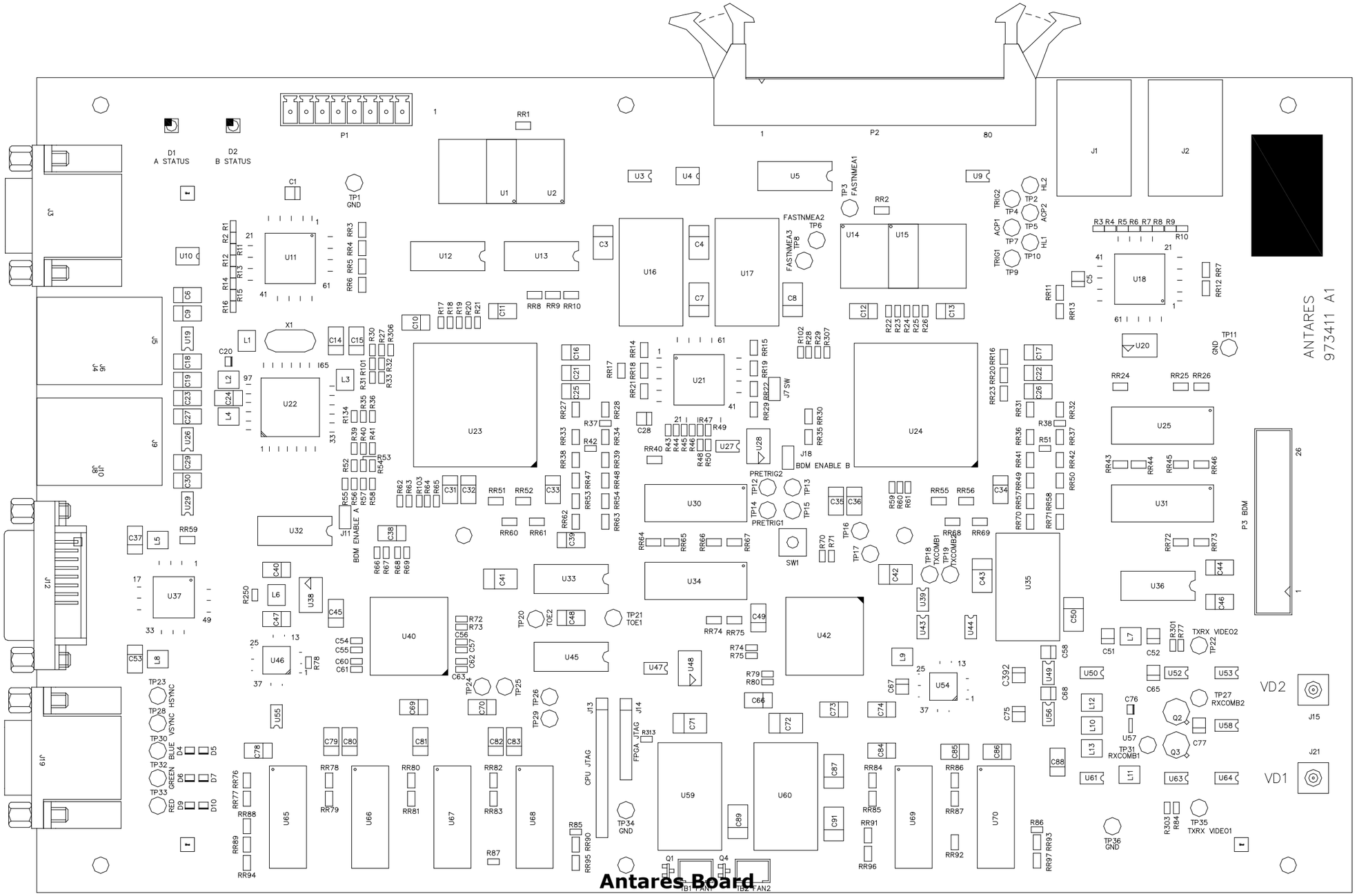
Display Core Unit Internal Connection with SRT Power Supply


TB1
TB2
TB3
TB4
TB5
TB6
TB7
TB8
TB9
TB10
TB11
TB12
TB14
TB15
TB17
TB18
TB19
TB20
U18
U32
RV1
RV11
RV12
F2
XF2
F3
XF3
JP2
ALPHA
973441 A1
K1
K2
K3
P1
P6
J1
J2
J3
J4
J5
J6
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
Vout
GND
Vout
Vin
GND
Vin

Alpha Board

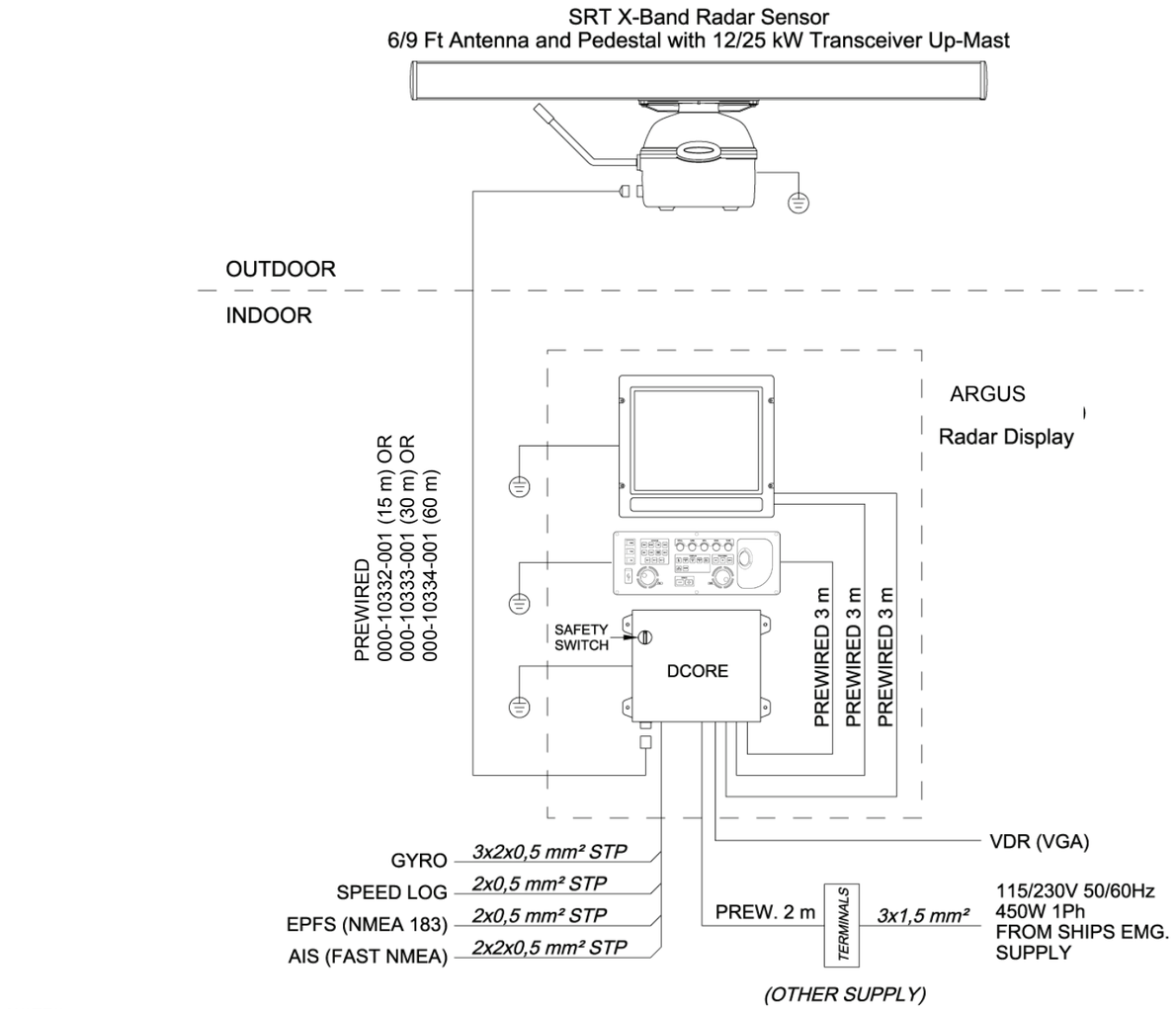


Alpha Expansion Board



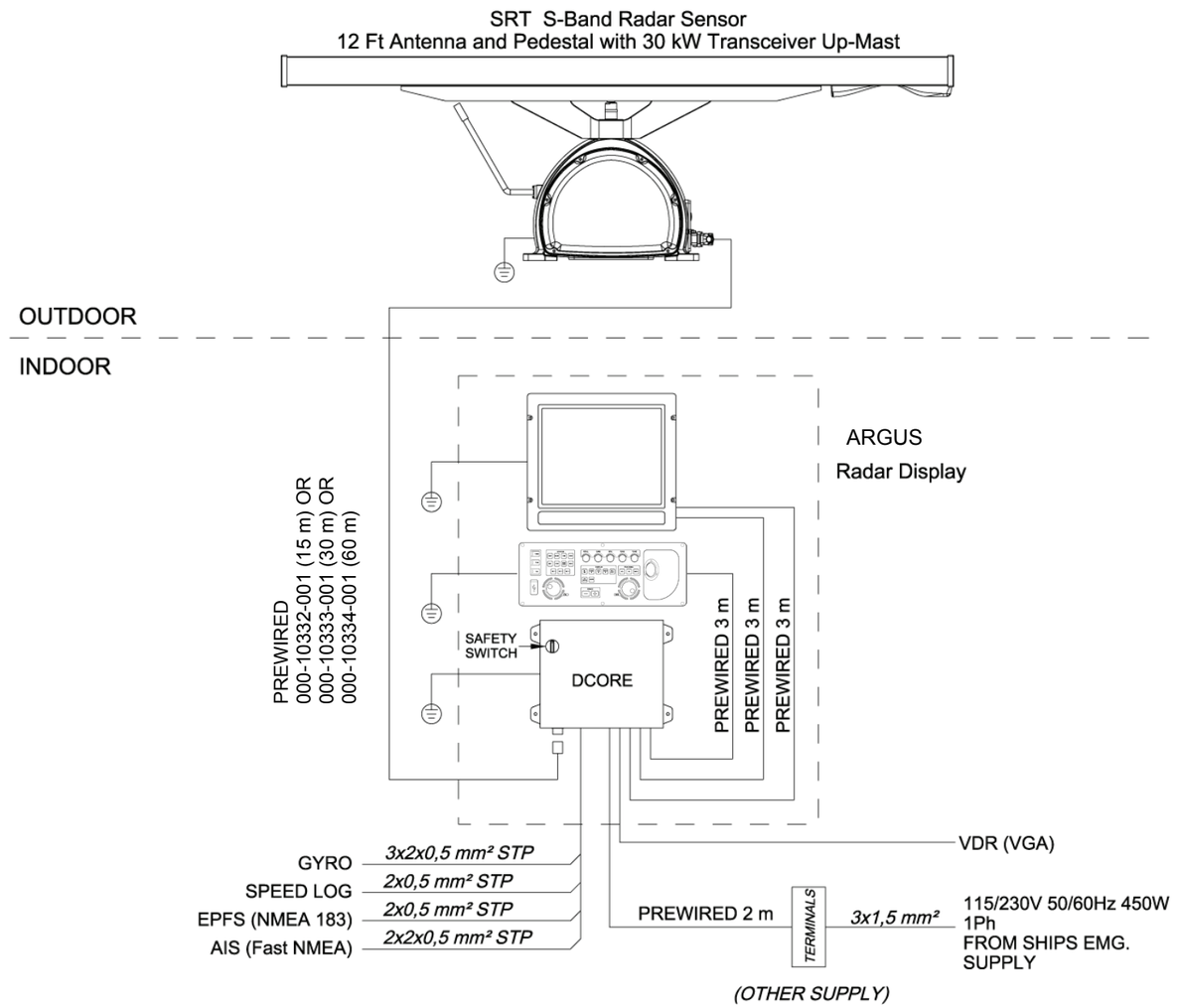
Antares Board

CHAPTER 7 ANNEX B



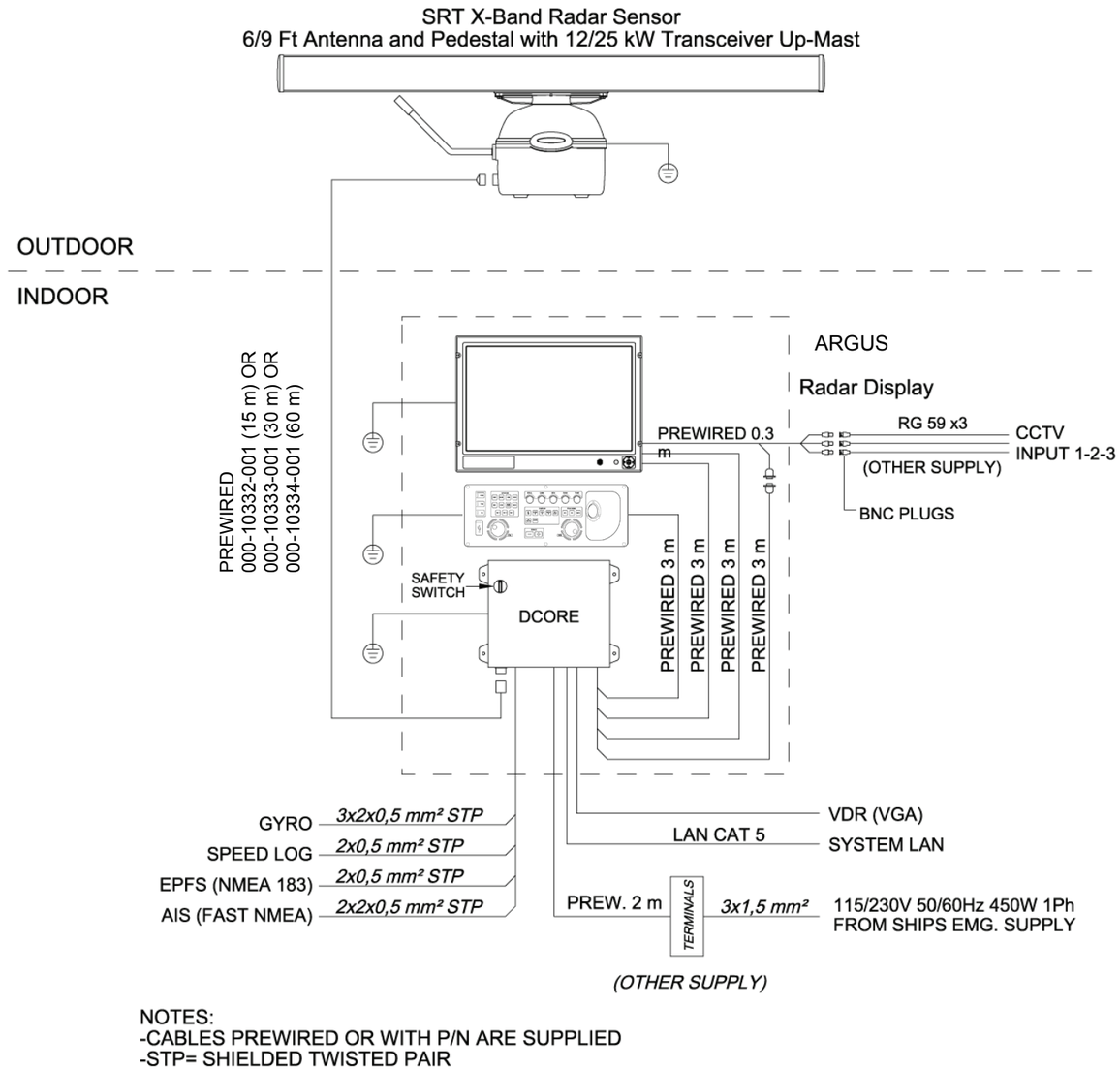
NOTES:
-CABLES PREWIRED OR WITH P/N ARE SUPPLIED
-STP= SHIELDED TWISTED PAIR

Block Diagram ARGUS with SRT X-Band Up-Mast Radar Sensor



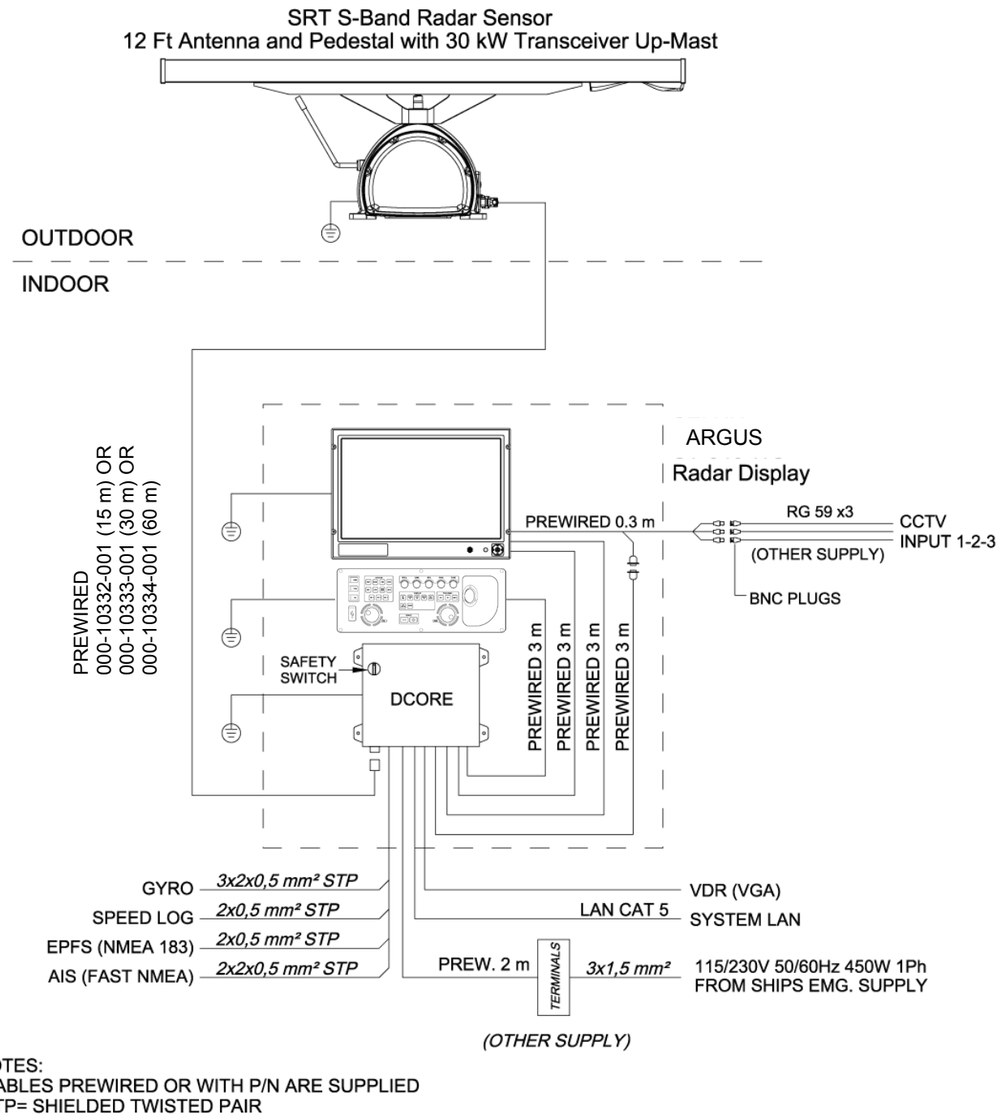
NOTES:
-CABLES PREWIRED OR WITH P/N ARE SUPPLIED
-STP= SHIELDED TWISTED PAIR

Block Diagram ARGUS with SRT S-Band Up-Mast Radar Sensor



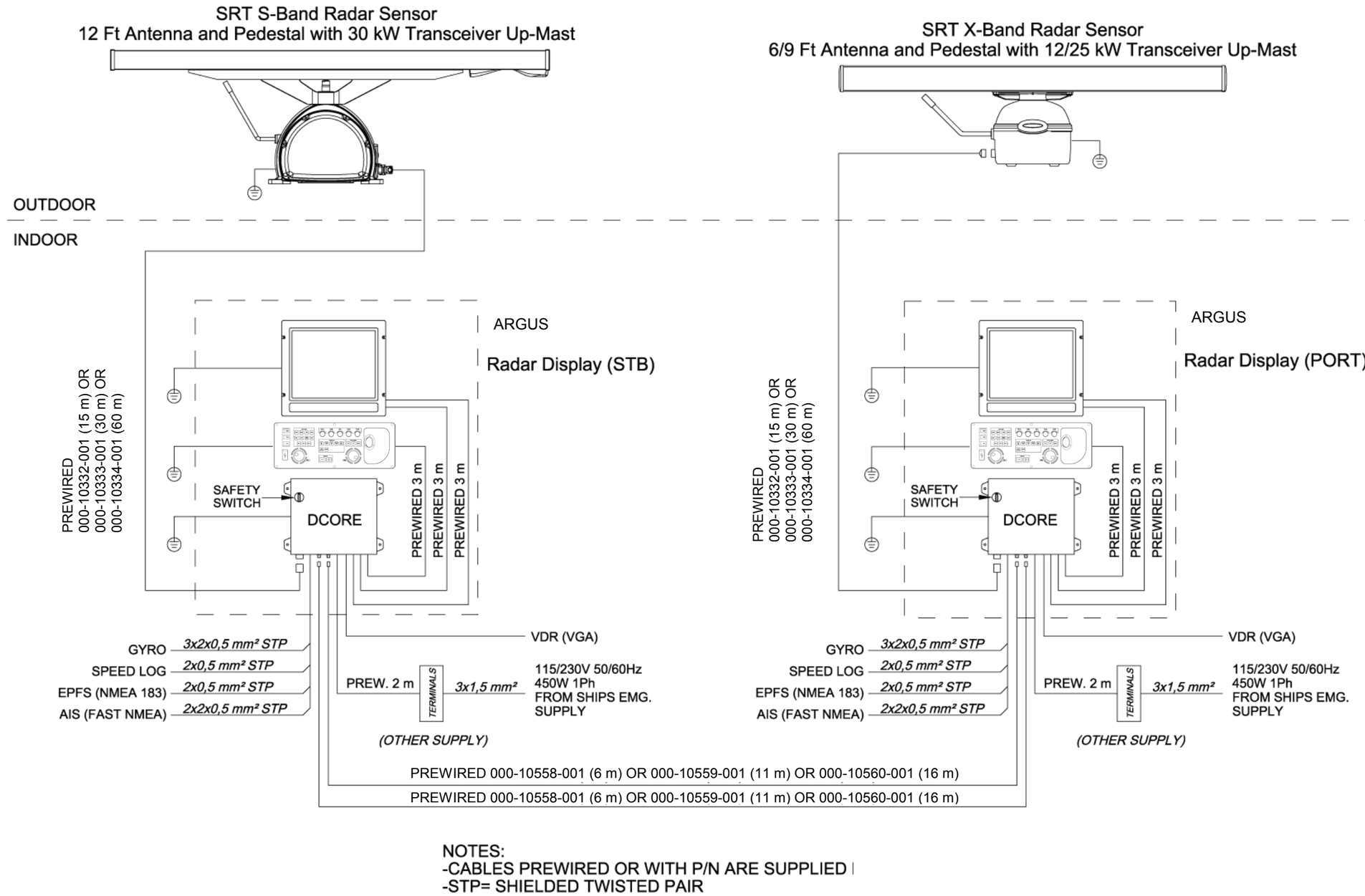
NOTES:
-CABLES PREWIRED OR WITH P/N ARE SUPPLIED
-STP= SHIELDED TWISTED PAIR

Block Diagram ARGUS WS with SRT X-Band Up-Mast Radar Sensor



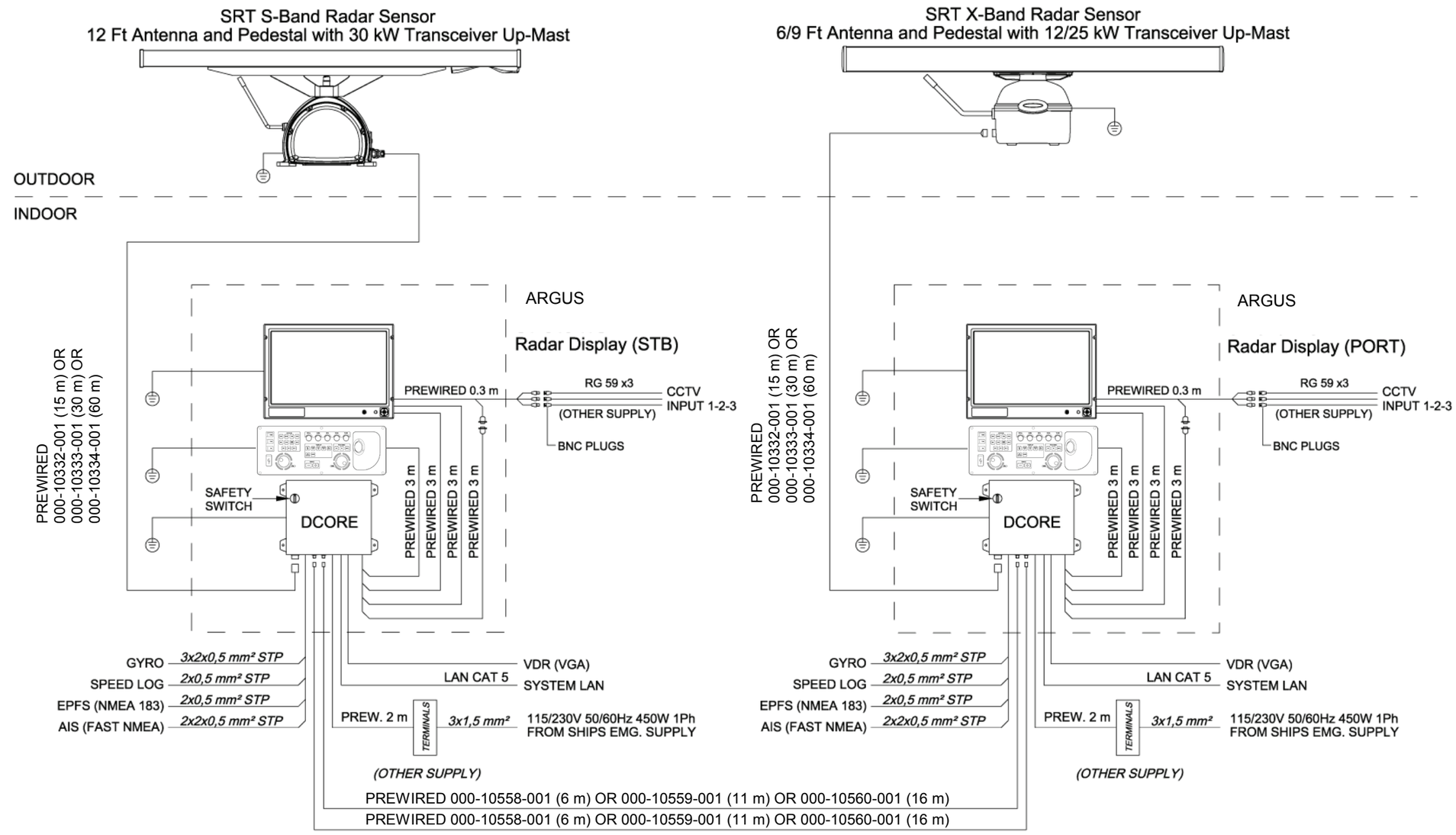
NOTES:
-CABLES PREWIRED OR WITH P/N ARE SUPPLIED
-STP= SHIELDED TWISTED PAIR

Block Diagram ARGUS WS with SRT S-Band Up-Mast Radar Sensor



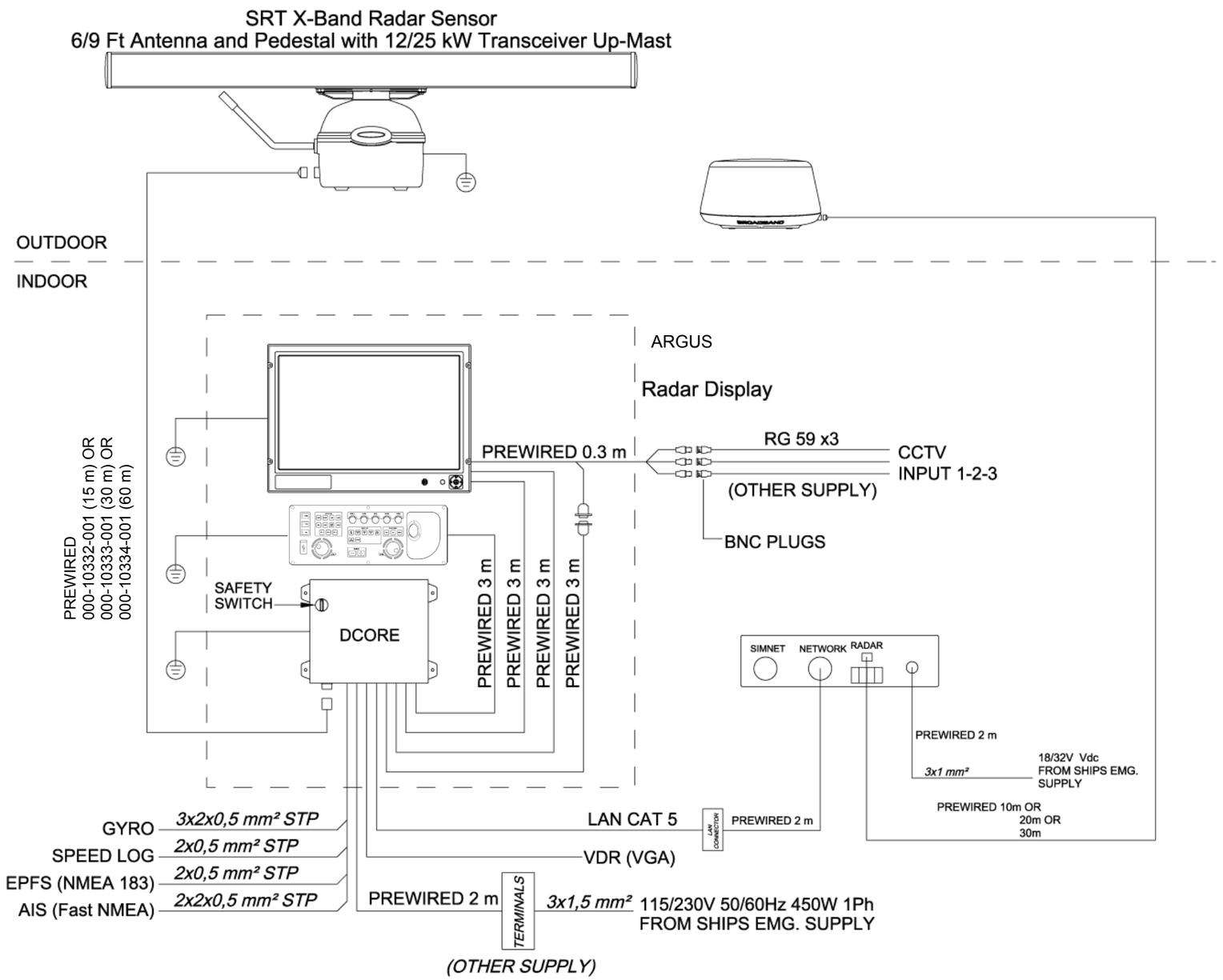
NOTES:
-CABLES PREWIRED OR WITH P/N ARE SUPPLIED
-STP= SHIELDED TWISTED PAIR

Block Diagram Dual ARGUS with SRT X-Band and S-Band Up-Mast Radar Sensor



NOTES:
-CABLES PREWIRED OR WITH P/N ARE SUPPLIED
-STP= SHIELDED TWISTED PAIR

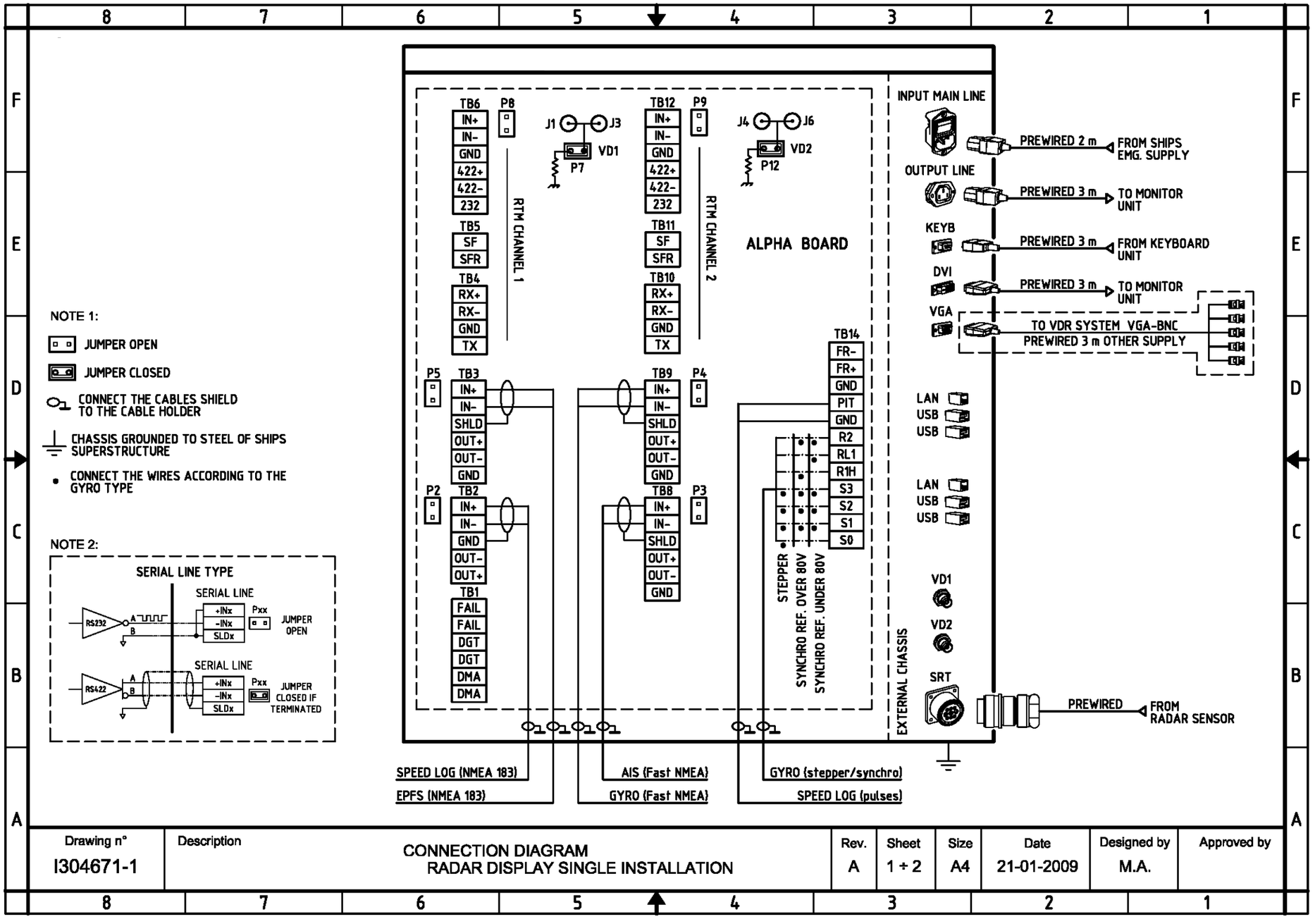
Block Diagram Dual ARGUS WS with SRT X-Band and S-Band Up-Mast Radar Sensor



NOTES:
-CABLES PREWIRED OR WITH P/N ARE SUPPLIED
-STP= SHIELDED TWISTED PAIR

Block Diagram ARGUS WS with SRT X-Band Up-Mast Radar Sensor and FMCW Radar

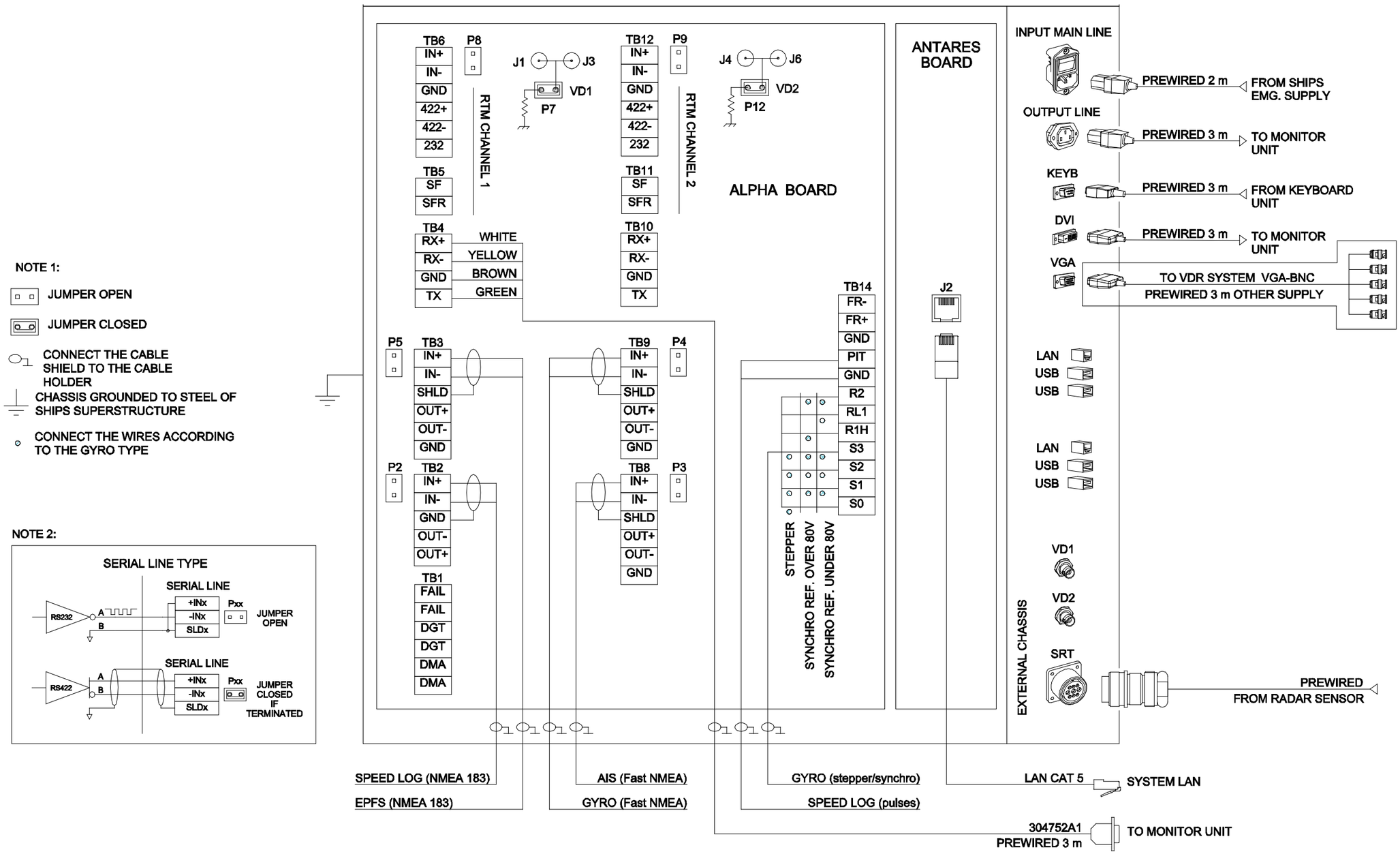
ARGUS Core Unit



Drawing n°	Description	Rev.	Sheet	Size	Date	Designed by	Approved by
I304671-1	CONNECTION DIAGRAM RADAR DISPLAY SINGLE INSTALLATION	A	1 ÷ 2	A4	21-01-2009	M.A.	

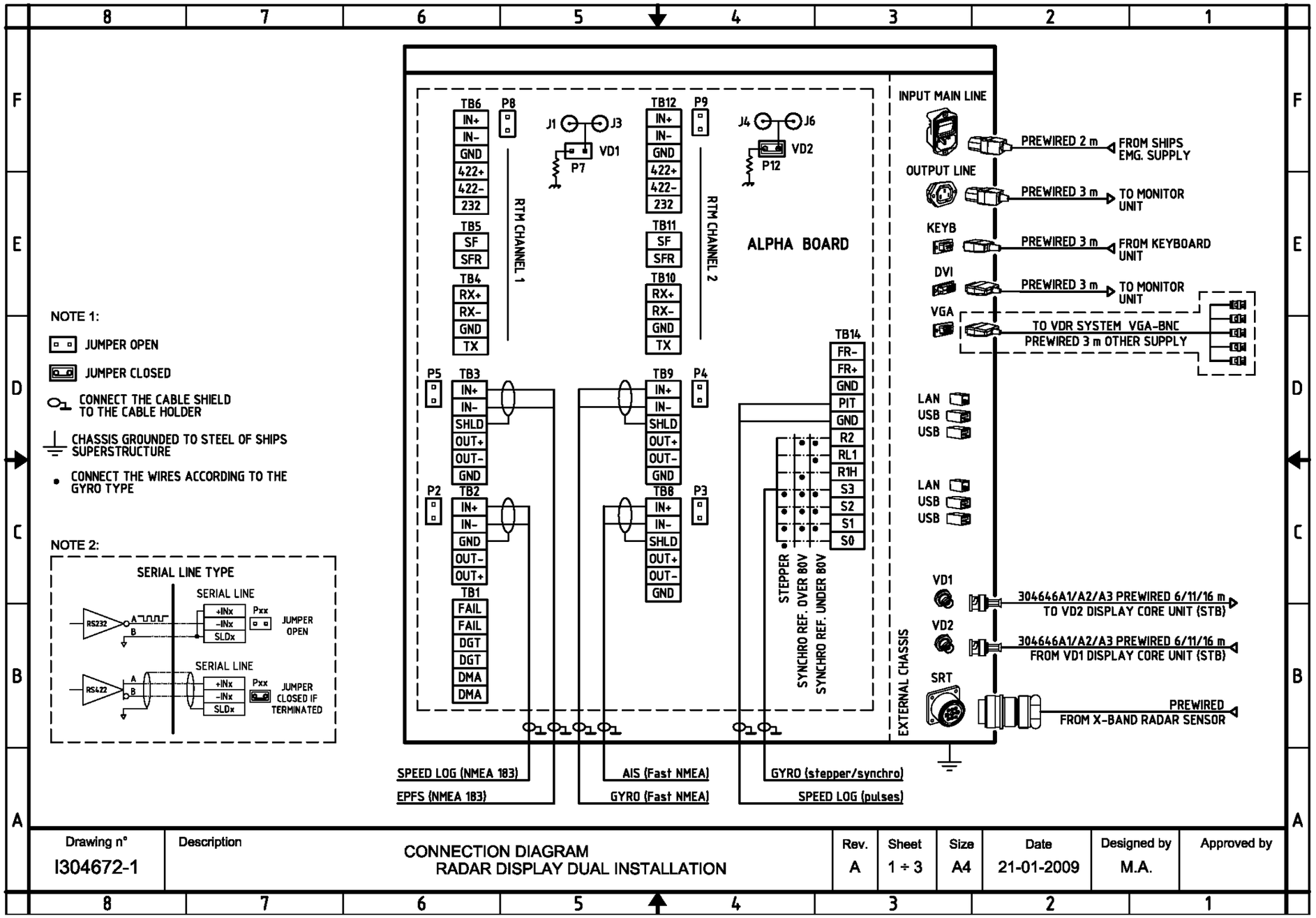
Connection Diagram ARGUS Single Installation

ARGUS Core Unit



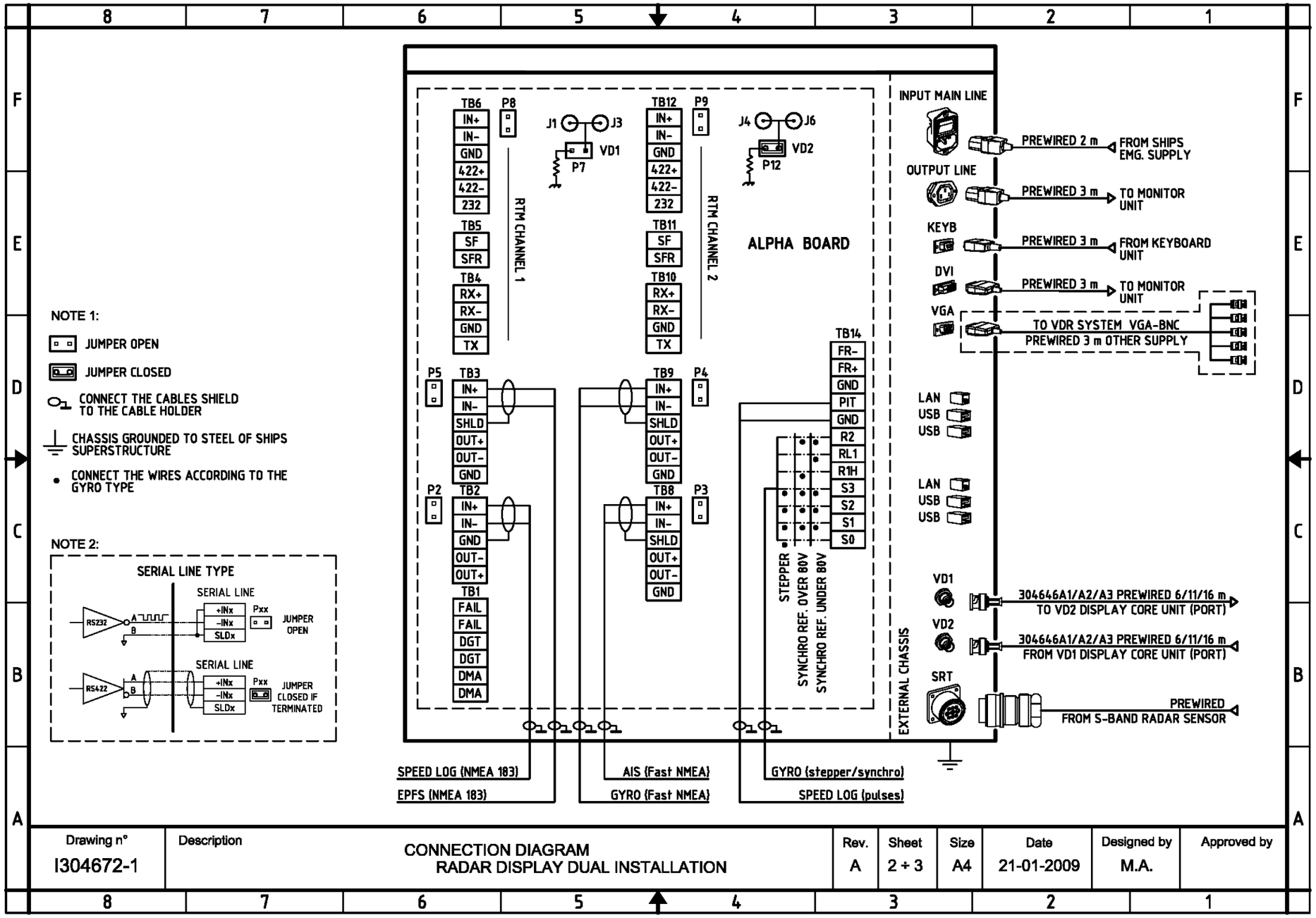
Connection Diagram ARGUS WS Single Installation

ARGUS Core Unit (PORT)



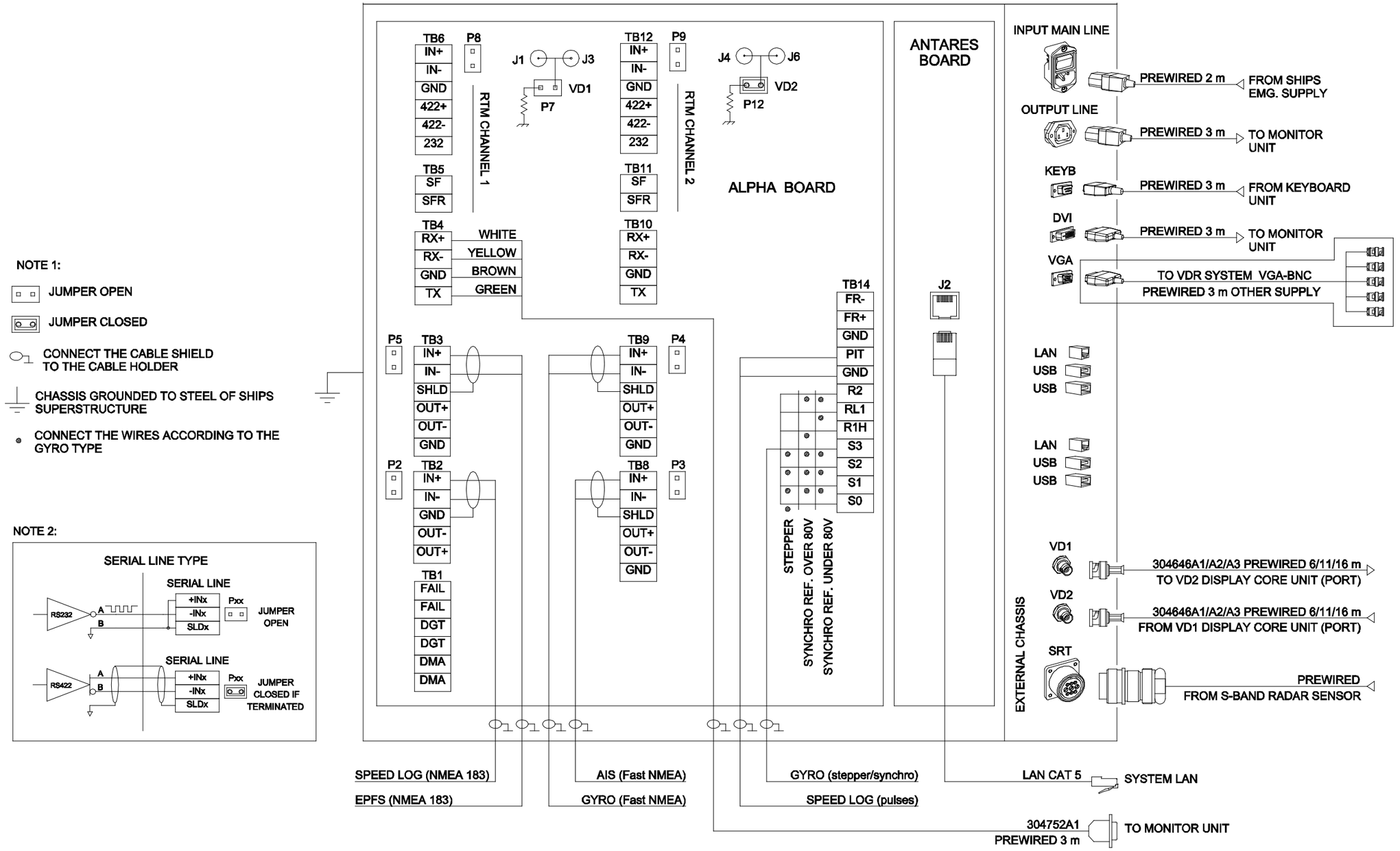
Connection Diagram ARGUS Dual Installation (PORT)

ARGUS Core Unit (STB)



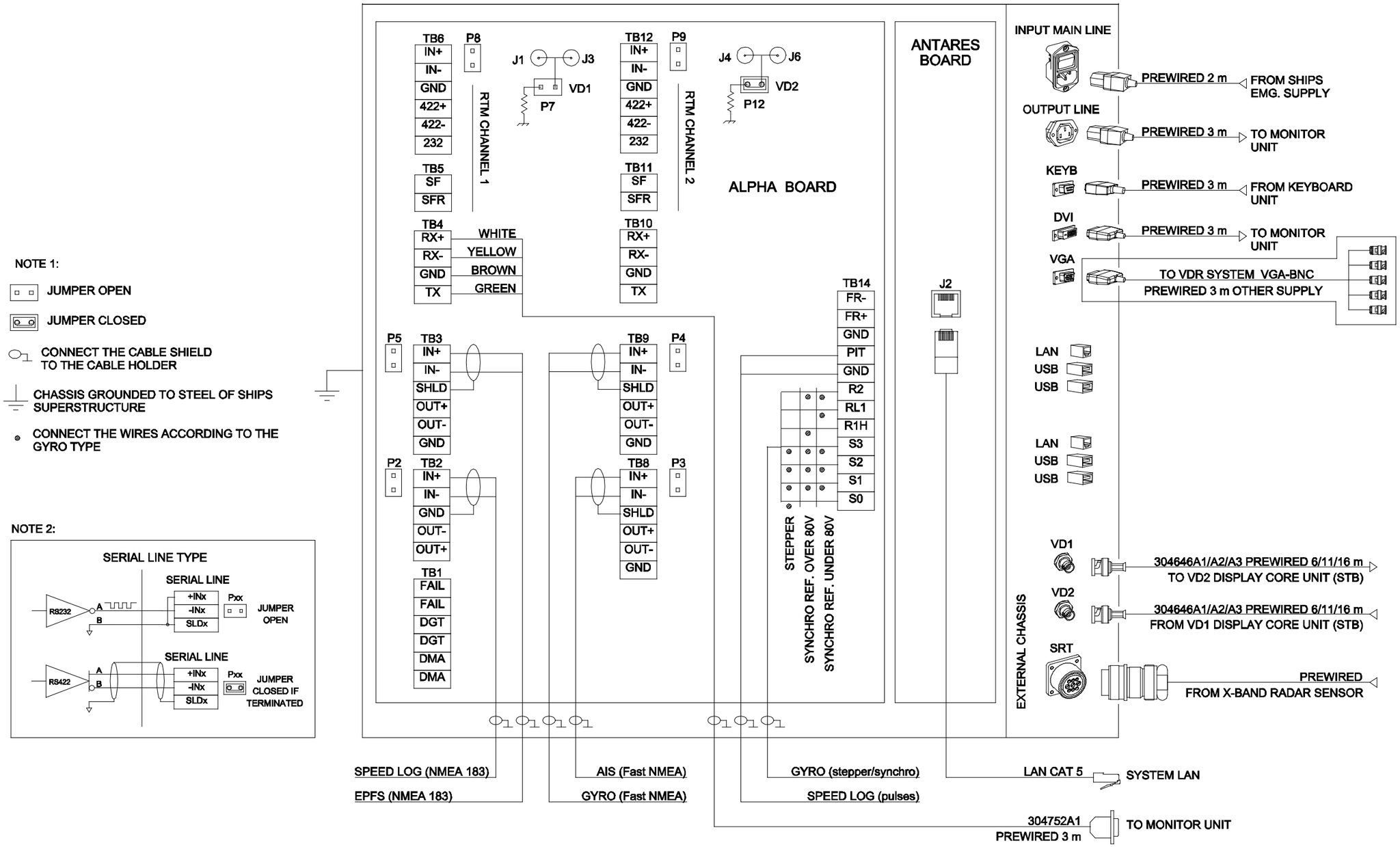
Connection Diagram ARGUS Dual Installation (STB)

ARGUS Core Unit (STB)



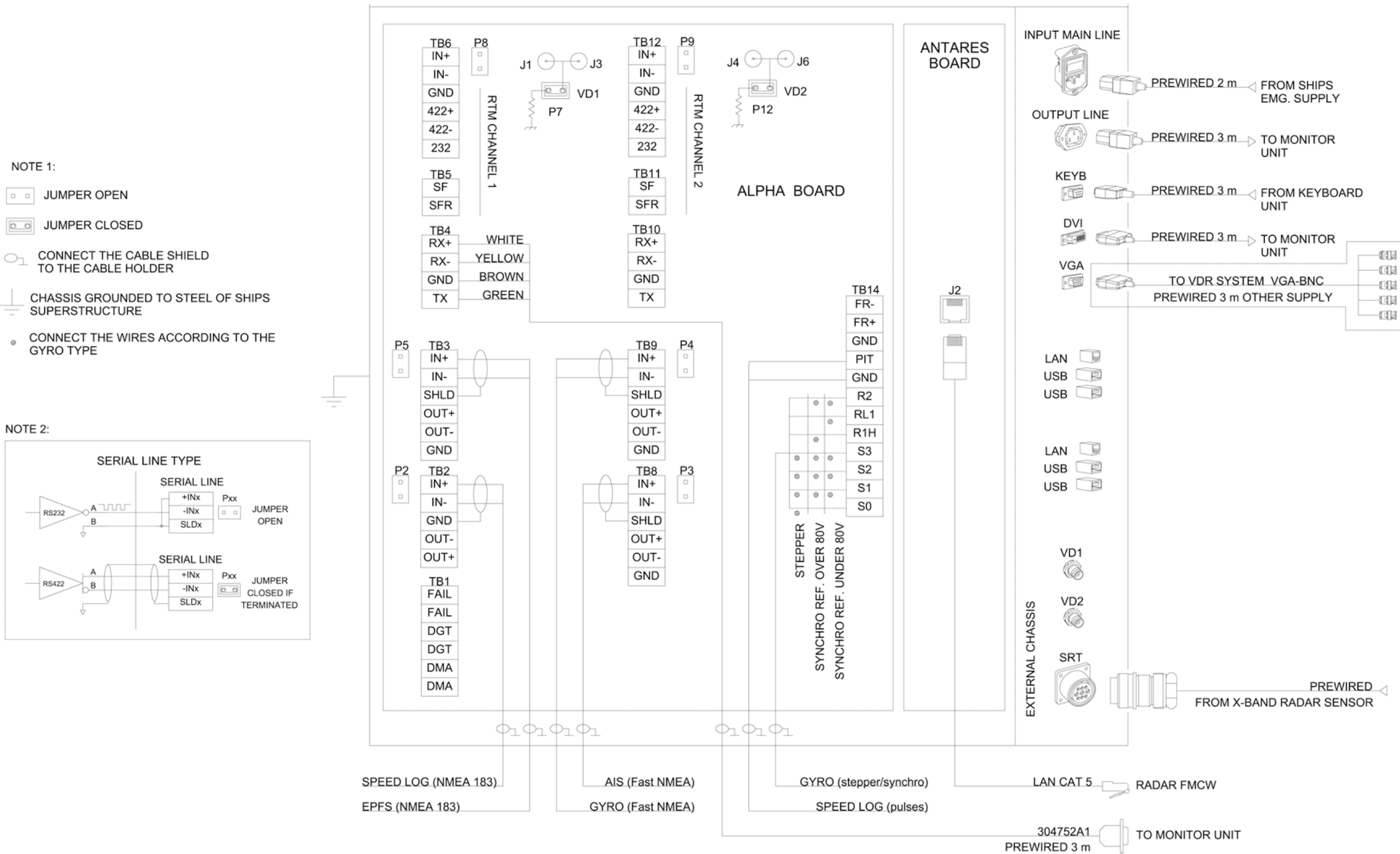
Connection Diagram ARGUS WS Dual Installation (STB)

ARGUS Core Unit (PORT)

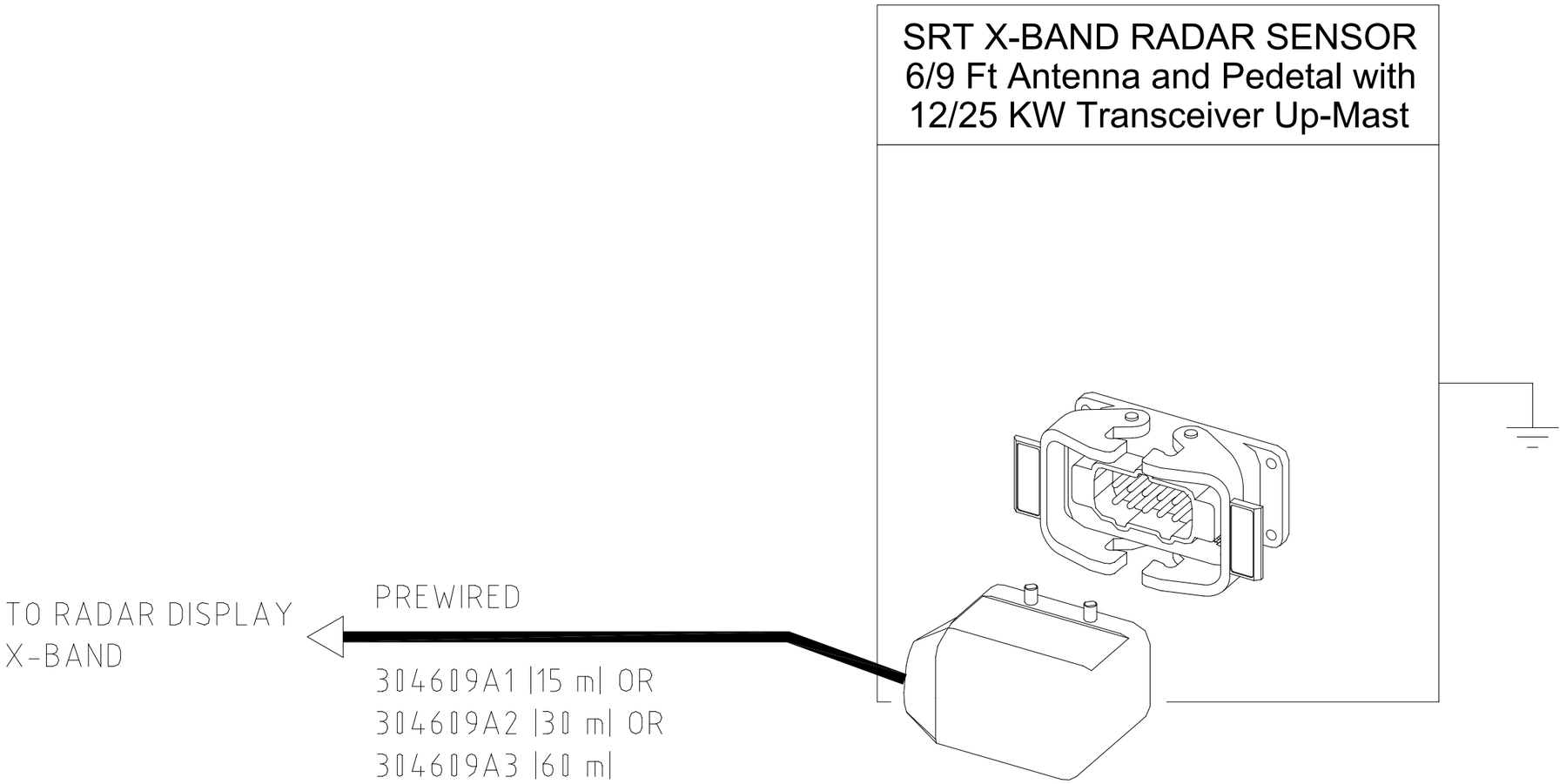


Connection Diagram ARGUS WS Dual Installation (PORT)

ARGUS Core Unit



Connection Diagram ARGUS WS Single Installation with FMCW Radar

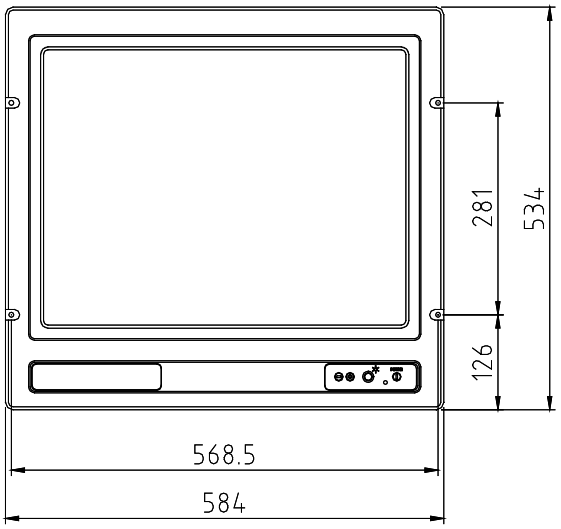


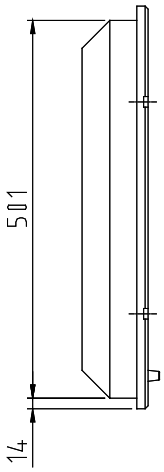
Connection Diagram SRT X-Band Up-Mast Radar Sensor

ARGUS DISPLAY – 19” Monitor outline drawing

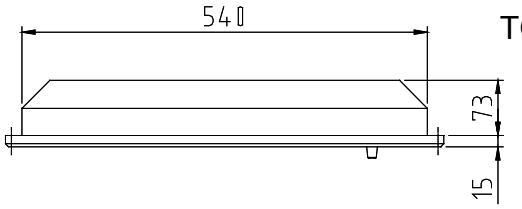
All dimensions are in mm. Weight 17-21 Kg IP 65

FRONT VIEW





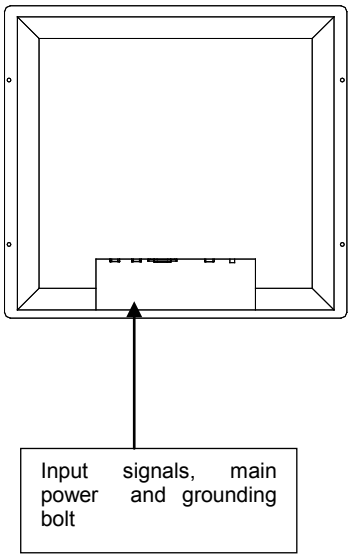
SIDE VIEW



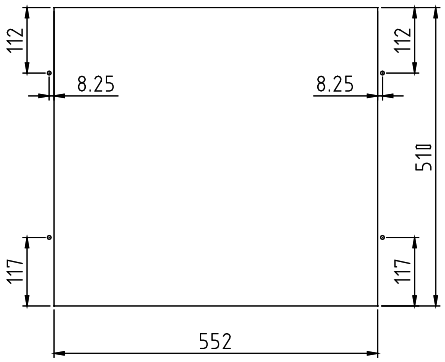
TOP VIEW

A - Drill n. 4 thru-holes metric thread M6x1x6 minimum (thread code x pitch x depth) for steel or stainless steel panel.
For aluminium panel increase depth to 12 minimum.
Or drill n. 4 thru-holes and mounting n. 4 self-clinching nuts M6x1.

REAR VIEW



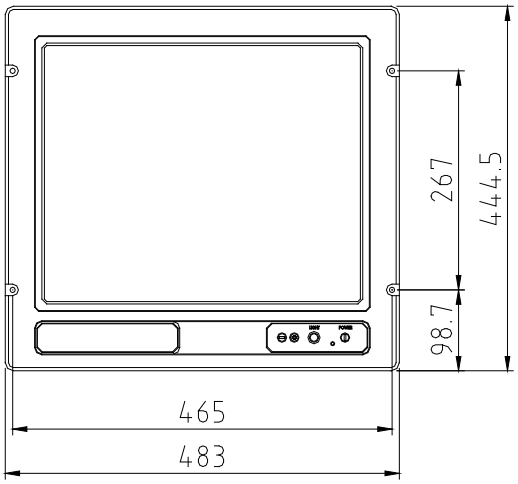
PANEL CUT-OUT

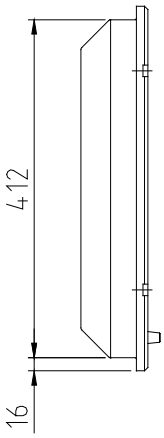


ARGUS DISPLAY – 23.1” Monitor dimensional drawing

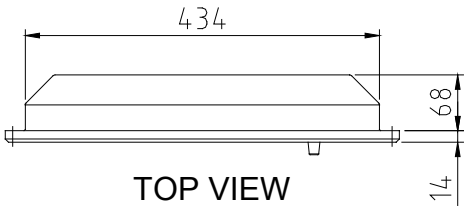
All dimensions are in mm . Weight 12-16 Kg IP 65

FRONT VIEW





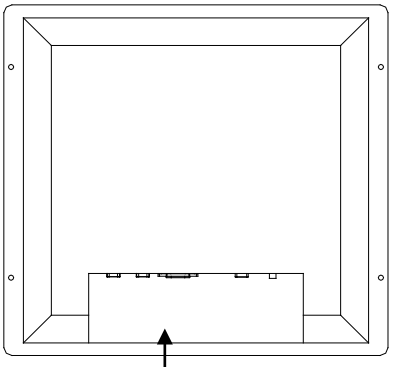
SIDE VIEW



TOP VIEW

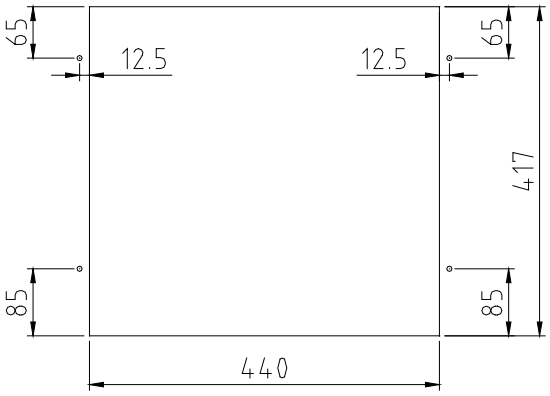
A - Drill n. 4 thru-holes metric thread M6x1x6 minimum (thread code x pitch x depth) for steel or stainless steel panel.
For aluminium panel increase depth to 12 minimum.
Or drill n. 4 thru-holes and mounting n. 4 self-clinching nuts M6x1.

REAR VIEW



Input signals, main power and grounding bolt

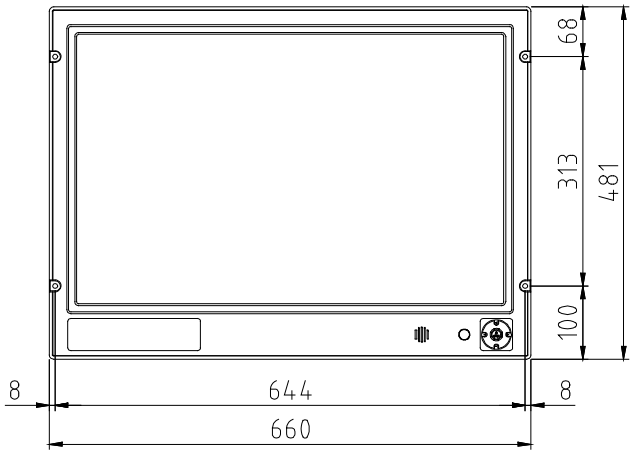
PANEL CUT-OUT

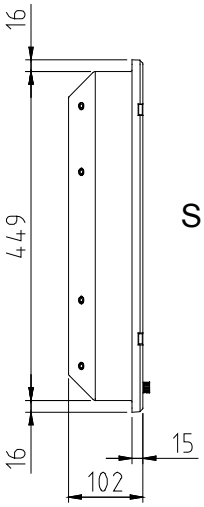


ARGUS DISPLAY – 27” Wide Screen Monitor dimensional drawing

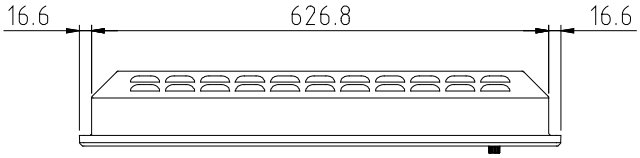
All dimensions are in mm. Weight 16 Kg IP30

FRONT VIEW



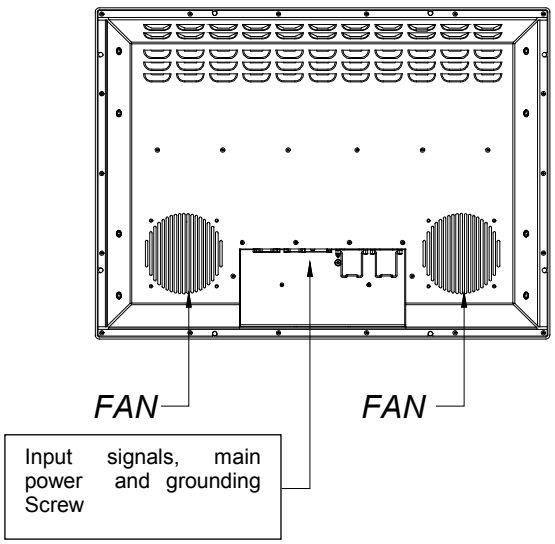


SIDE VIEW



A - Drill n. 4 thru-holes metric thread M6x1x6 minimum (thread code x pitch x depth) for steel or stainless steel panel.
For aluminium panel increase depth to 12 minimum.
Or drill n. 4 thru-holes and mounting n. 4 self-clinching nuts M6x1.

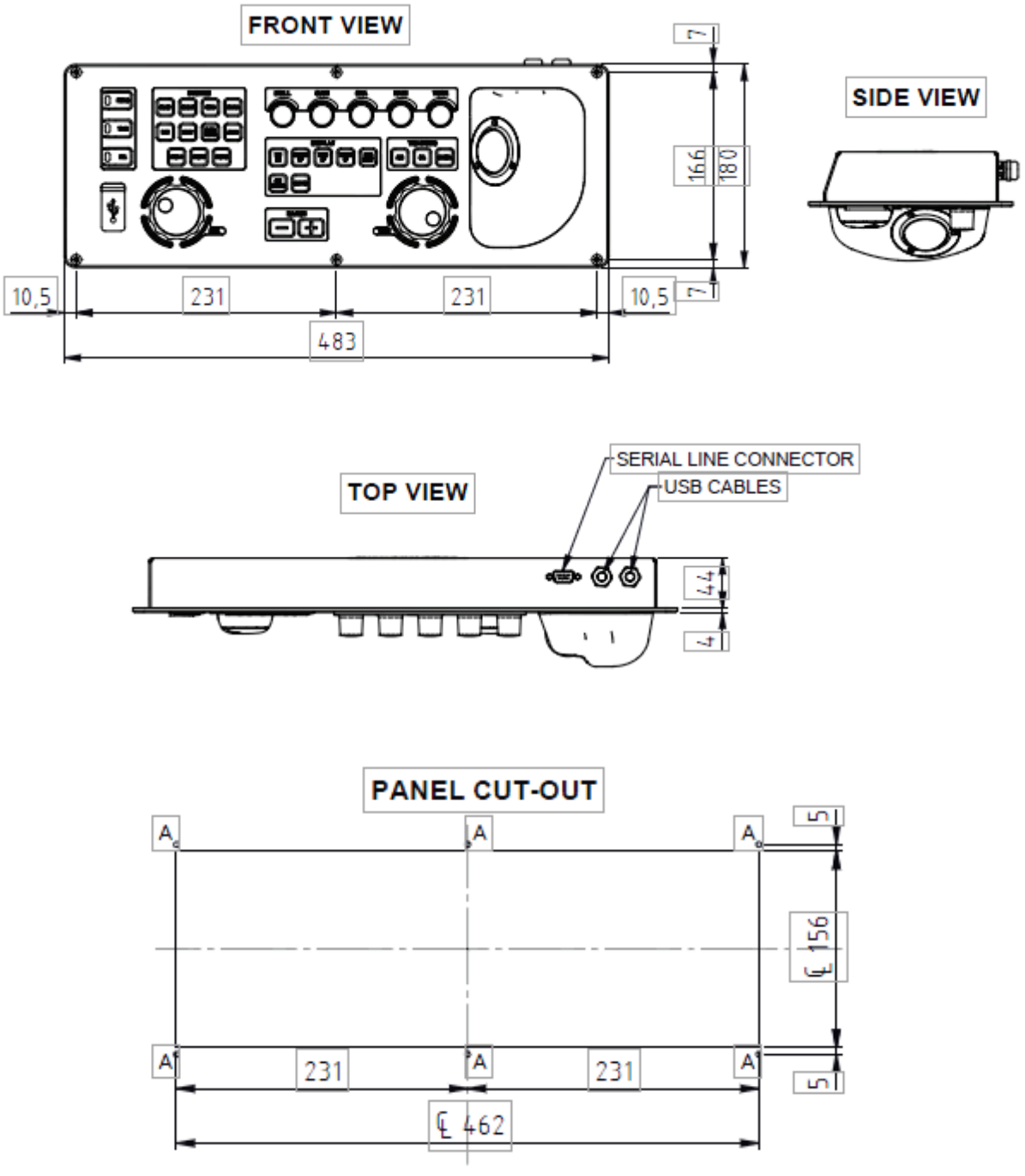
REAR VIEW



PANEL CUT-OUT

ARGUS RADAR SYSTEM – Control Panel dimensional drawing

All dimensions are in mm. Weight 2.7 Kg IP 30

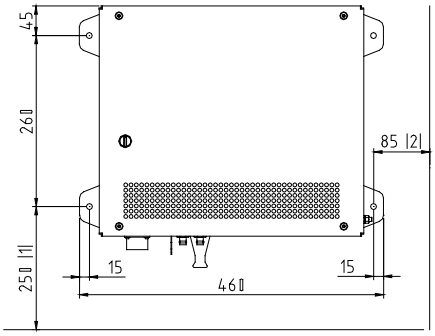


Drill 6 holes (A), metric thread M4x0.7x4 minimum (thread code x pitch x depth) for steel or stainless steel panel. For aluminium panel depth should be 8 mm minimum. Or drill 6 holes and mount 6 self-clinching nuts M4x0.7 in the panel.

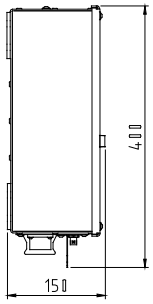
ARGUS RADAR SYSTEM – CORE UNIT outline drawing

All dimensions are in mm. Weight 9 Kg IP 20

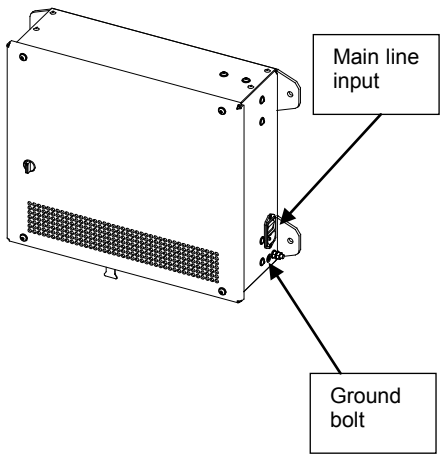
FRONT VIEW



SIDE VIEW



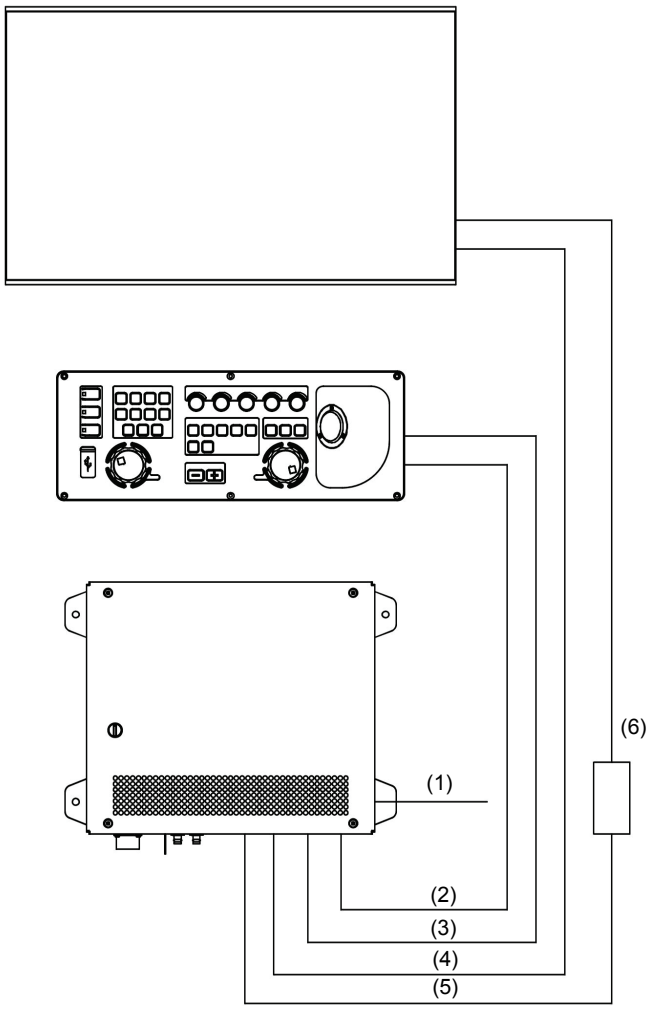
3D VIEW



(1) Minimum distance to the floor
(2) Minimum distance to the wall and to other equipment

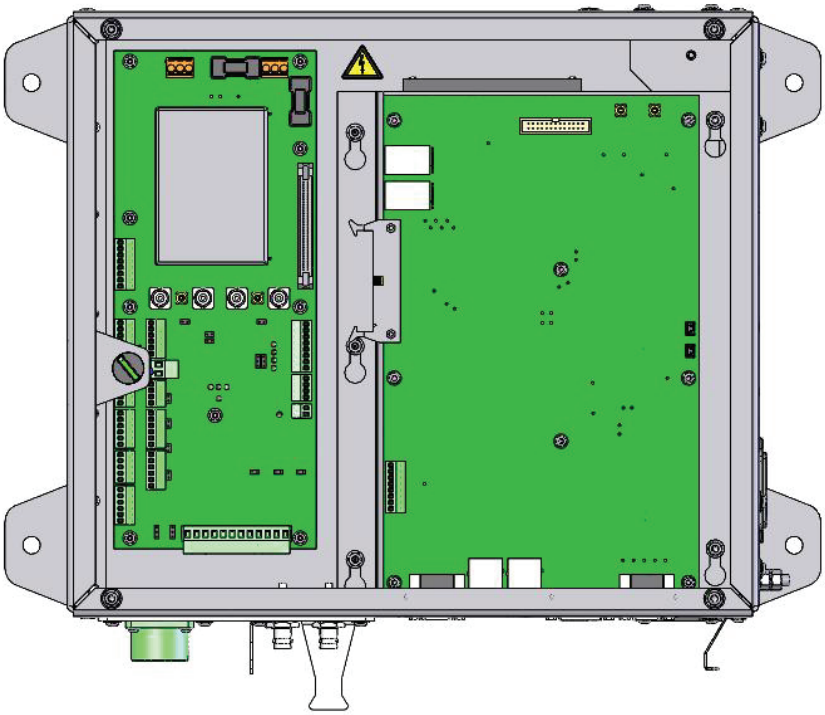
For installation drill 4 holes ∅12 or
drill 4 holes, metric thread M8x1.25x8 minimum (thread code x pitch x depth) for steel or stainless steel support. For alluminium support depth should be 16 minimum

ARGUS DISPLAYS – Cable lengths

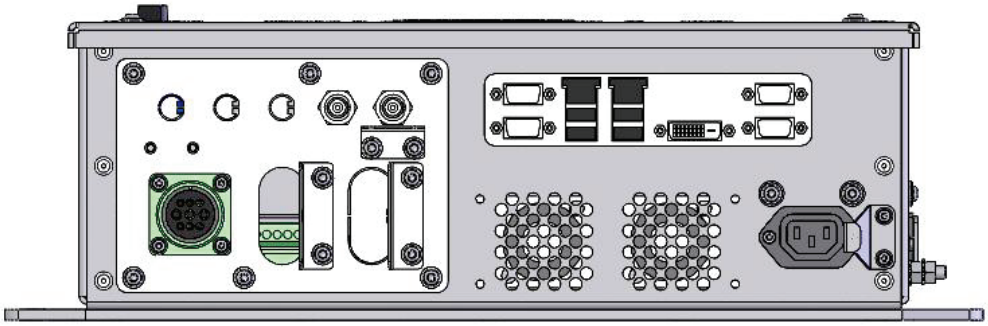


(1) Main line cable - max length 2 m.
(2) Keyboard cable - max length 3 m.
(3) Keyboard USB extension cable – max length 3 m.
(4) DVI/DVI cable - max length 3 m.
(5) Power supply cable – max length 2 m.
(6) Monitor supply cable - max length 1.8 m.

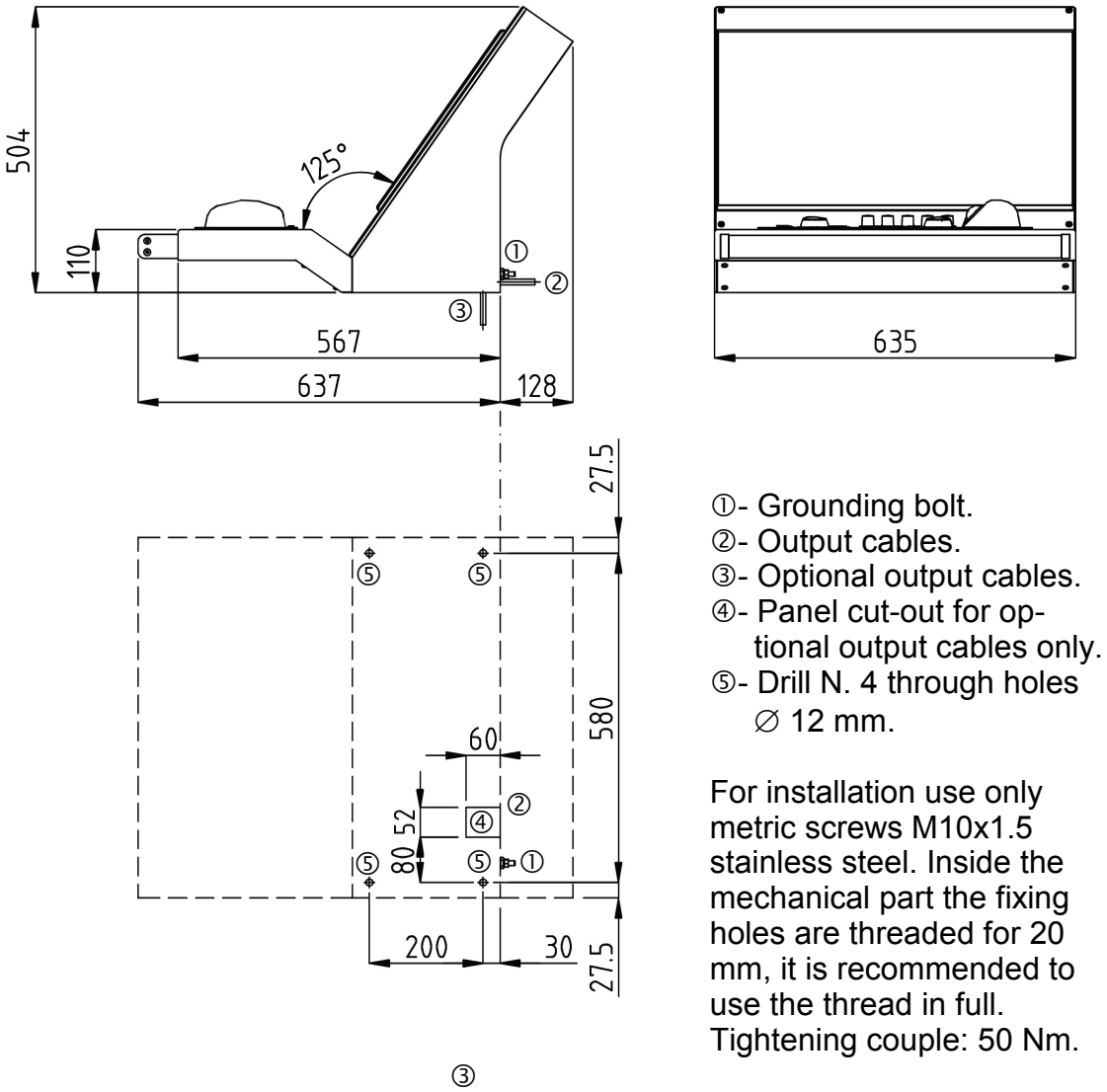
DISPLAY CORE UNIT internal view



DISPLAY CORE UNIT (304550A1) bottom view



ARGUS DISPLAYS Desk Mounting Version Outline Drawing



①- Grounding bolt.
②- Output cables.
③- Optional output cables.
④- Panel cut-out for optional output cables only.
⑤- Drill N. 4 through holes ∅ 12 mm.

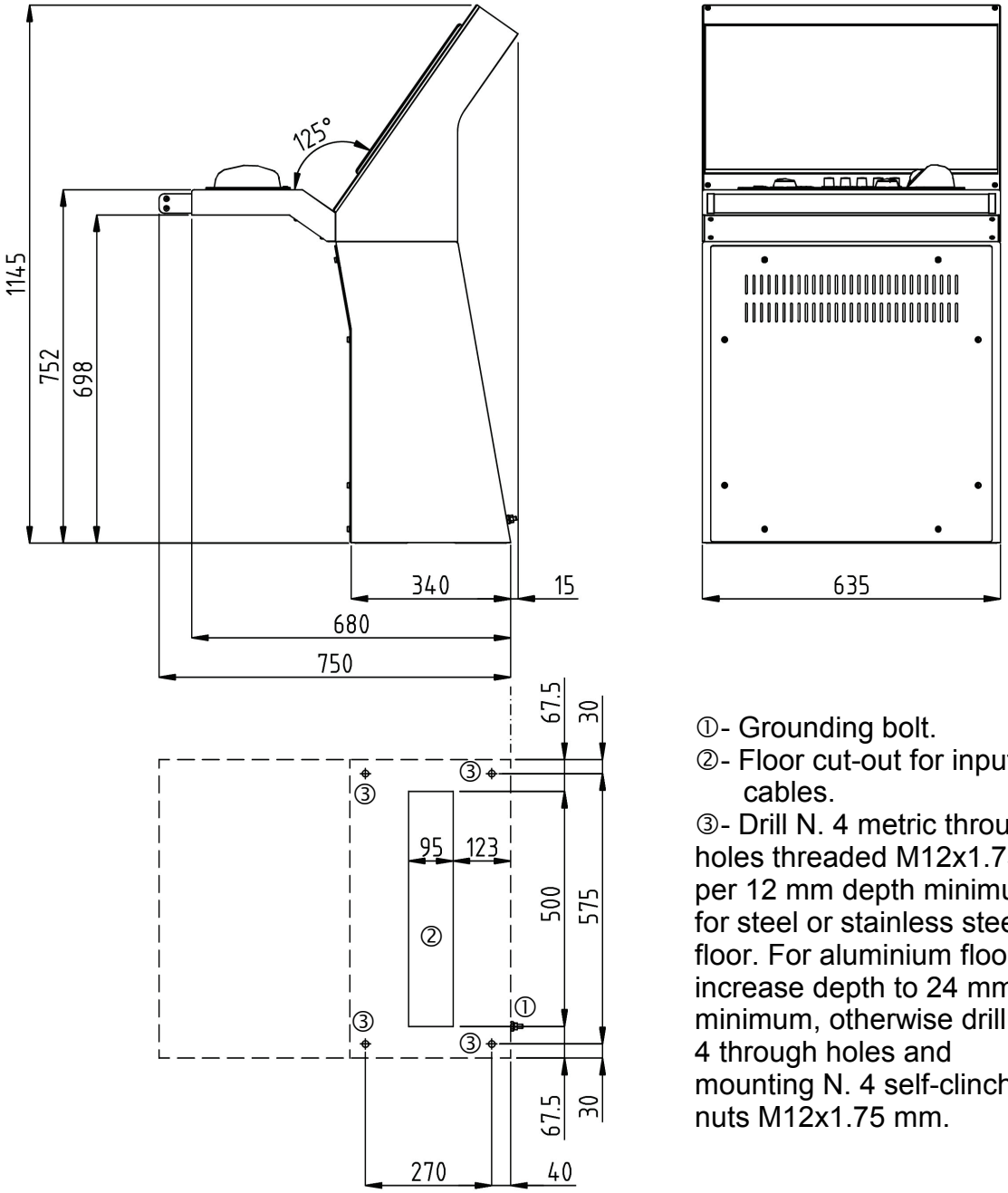
For installation use only metric screws M10x1.5 stainless steel. Inside the mechanical part the fixing holes are threaded for 20 mm, it is recommended to use the thread in full. Tightening couple: 50 Nm.

③

Weight 20 Kg IP 23

Monitor and Keyboard mounted on the mechanical part
All dimensions are in mm

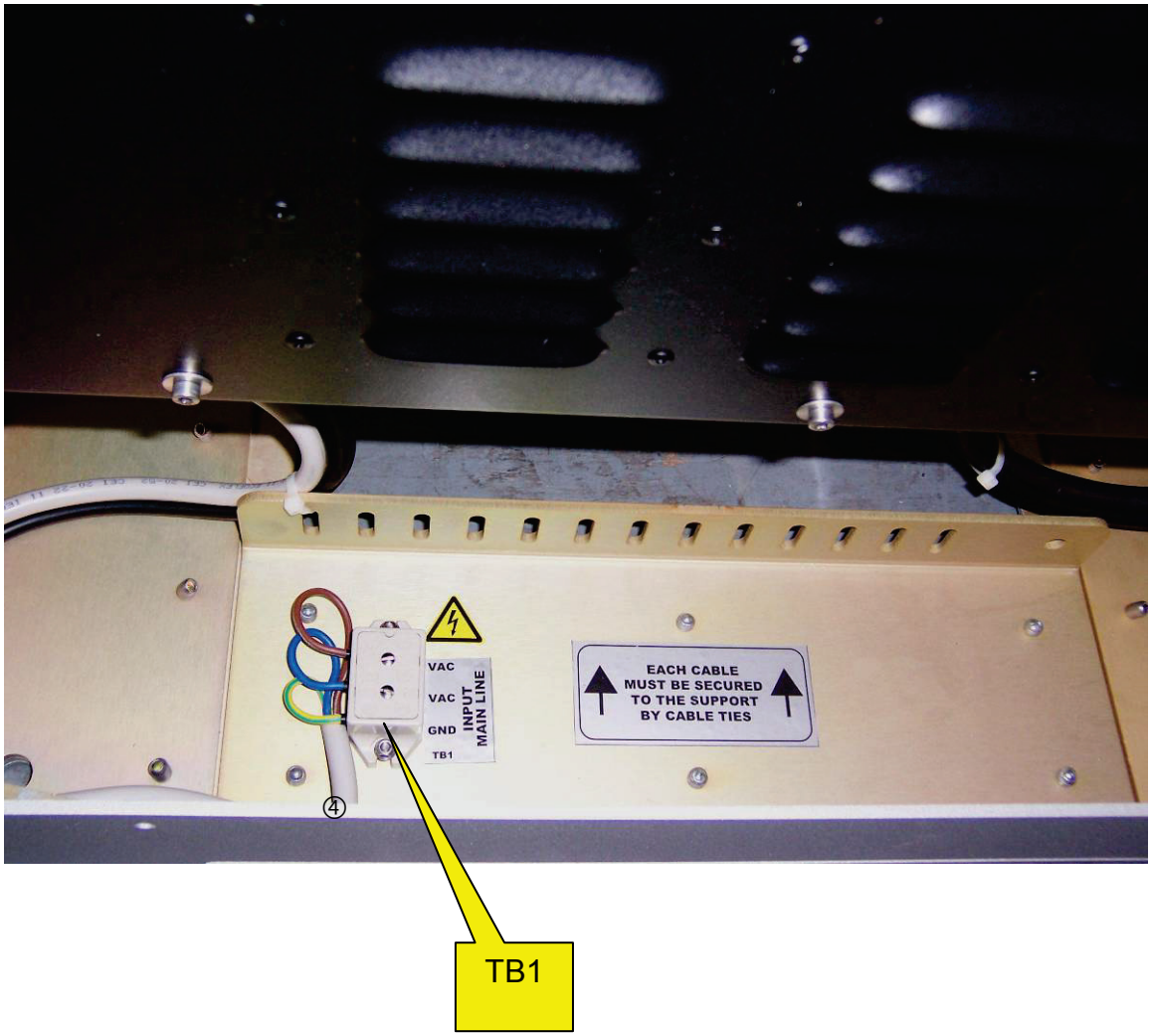
ARGUS DISPLAYS Deck Mounting Version Outline Drawing



①- Grounding bolt.
②- Floor cut-out for input cables.
③- Drill N. 4 metric through holes threaded M12x1.75 per 12 mm depth minimum for steel or stainless steel floor. For aluminium floor, increase depth to 24 mm minimum, otherwise drill N. 4 through holes and mounting N. 4 self-clinching nuts M12x1.75 mm.

Weight 53 Kg IP 20
All dimensions are in mm

The following picture shows the terminal board (TB1) located at the bottom of the pedestal, used for ARGUS deck mounting ship's main line connection.



CHAPTER 8 ANNEX C

System Installation Checklist

VESSEL:	Customer's ref:
Equipment type:	DCORE (for all installed consoles) Serial n° :

A.	**Gyrocompass Configuration**
☐	Gyro connected as: Synchro ☐ Stepper ☐ NMEA ☐ Fast NMEA ☐
☐	For Gyro Stepper connection Reference generated internally ☐ Negative Phases ☐
☐	For Gyro Synchro/Stepper connection 1:36 ☐ 1:90 ☐ 1:180 ☐ 1:360 ☐
☐	For Gyro NMEA/Fast NMEA connection Com1 ☐ Com2 ☐ Com3 ☐
☐	Check Gyro clockwise/anticlockwise rotation for synchro/stepper, after gyro preset Check Gyro value validity with NMEA serial connection.
B.	**Speed LOG Configuration**
☐	Speed LOG connected as: 100 p/NM ☐ 200 p/NM ☐ 400 p/NM ☐ 120 p/mt ☐ 20000 p/NM ☐ NMEA ☐
☐	For Speed NMEA connection Dual Axis ☐ Com1 ☐ Com2 ☐ Com3 ☐
☐	Check Speed Log value validity with NMEA serial connection.
C.	**Ownship Dimension and Weight**
☐	Width = ... m Length = ... m Weight = ... T
D.	**Conning and EPFS Position**
☐	Conning Position X = ... m Y = ... m EPFS to Antenna Position X = ... m Y = ... m

E.	**Serial Port Settings**
☐	
F.	**Antenna Settings**
☐	**TXRX 1** 6'X ☐ 9'X ☐ 12'X ☐ 12'S ☐ Antenna Position & Height X = ... m Y = ... m H = ... m PPR: 128 ☐ 132 ☐ 1024 ☐ 4096 ☐ HL Alignment = ... ° HL Type: Positive ☐ Negative ☐ Created STC Tabs ☐ Wide Log ☐
☐	**TXRX 2** 6'X ☐ 9'X ☐ 12'X ☐ 12'S ☐ Antenna Position & Height X = ... m Y = ... m H = ... m PPR: 128 ☐ 132 ☐ 1024 ☐ 4096 ☐ HL Alignment = ... ° HL Type: Positive ☐ Negative ☐ Created STC Tabs ☐ Wide Log ☐
☐	**TXRX 3** 6'X ☐ 9'X ☐ 12'X ☐ 12'S ☐ Antenna Position & Height X = ... m Y = ... m H = ... m PPR: 128 ☐ 132 ☐ 1024 ☐ 4096 ☐ HL Alignment = ... ° HL Type: Positive ☐ Negative ☐ Created STC Tabs ☐ Wide Log ☐
☐	**TXRX 4** 6'X ☐ 9'X ☐ 12'X ☐ 12'S ☐ Antenna Position & Height X = ... m Y = ... m H = ... m PPR: 128 ☐ 132 ☐ 1024 ☐ 4096 ☐ HL Alignment = ... ° HL Type: Positive ☐ Negative ☐ Created STC Tabs ☐ Wide Log ☐

G.	TXRX Settings On Board
☐	**TXRX 1** PreSTC .... Performance Monitor .... Tuning: Auto ☐ .... Sector1: On ☐ .... Sector2: On ☐ .... Draw Borders ☐
☐	**TXRX 2** PreSTC .... Performance Monitor .... Tuning: Auto ☐ .... Sector1: On ☐ .... Sector2: On ☐ .... Draw Borders ☐
☐	**TXRX 3** PreSTC .... Performance Monitor .... Tuning: Auto ☐ .... Sector1: On ☐ .... Sector2: On ☐ .... Draw Borders ☐
☐	**TXRX 4** PreSTC .... Performance Monitor .... Tuning: Auto ☐ .... Sector1: On ☐ .... Sector2: On ☐ .... Draw Borders ☐

H.	TXRX Radar Console Settings
☐	**TXRX 1** SXI ☐ Serial ☐ Other ☐ When SXI is selected: Console 1 Priority ..... Console 2 Priority ..... Console 3 Priority ..... Console 4 Priority ..... Communication Protocol Type : CS ☐ NMEA ☐ Trigger: Positive ☐ Negative ☐ Delay ..... m QV Threshold: Auto ☐ Manual ☐ ..... Video: Positive ☐ Negative ☐
☐	**TXRX 2** SXI ☐ Serial ☐ Other ☐ When SXI is selected: Console 1 Priority ..... Console 2 Priority ..... Console 3 Priority ..... Console 4 Priority ..... Communication Protocol Type : CS ☐ NMEA ☐ Trigger: Positive ☐ Negative ☐ Delay ..... m QV Threshold: Auto ☐ Manual ☐ ..... Video: Positive ☐ Negative ☐

H.	TXRX Radar Console Settings
☐	**TXRX 3** SXI ☐ Serial ☐ Other ☐ When SXI is selected: Console 1 Priority ..... Console 2 Priority ..... Console 3 Priority ..... Console 4 Priority ..... Communication Protocol Type : CS ☐ NMEA ☐ Trigger: Positive ☐ Negative ☐ Delay ..... m QV Threshold: Auto ☐ Manual ☐ ..... Video: Positive ☐ Negative ☐
☐	**TXRX 4** SXI ☐ Serial ☐ Other ☐ When SXI is selected: Console 1 Priority ..... Console 2 Priority ..... Console 3 Priority ..... Console 4 Priority ..... Communication Protocol Type :

H.	TXRX Radar Console Settings
	CS ☐ NMEA ☐ Trigger: Positive ☐ Negative ☐ Delay ..... m QV Threshold: Auto ☐ Manual ☐ ..... Video: Positive ☐ Negative ☐

I.	Video Level Adjustments
☐	Video Amplitude of CH1 ..... Video Amplitude of CH2 .....
J.	**System Configuration**
☐	Console 1 TXRX Default ..... Console 2 TXRX Default ..... Console 3 TXRX Default ..... Console 4 TXRX Default .....
K.	**Final Checks**
☐	Check AIS target superimposition on correct radar echoes.
☐	Check Interswitch function and Master/Slave operation.
☐	Check CCRP correctness at the lowest scale displaying radar antenna position.
☐	Backup Settings in USB Memory Module

Fields from A. to J. shall be fully compiled if the console settings files are not made available to Simrad.	
SYSTEM PERFORMANCE LIMITATIONS (BLIND SECTORS ETC..)	
ADDITIONAL NOTES:	
Setup and Installation was carried out according to Simrad Argus Radar System Installation & Service manual and Scanner Manual(s).	
Date ...../...../.....	Report Compiled by:

988-10187-003

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